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ABSTRACT

The college preparatory curriculum (CPC) in Georgia, is a state-mandated curriculum required of all high school seniors seeking to enter a University System institution as a regular placement freshman. Students deficient in any of the five CPC areas (English, foreign language, mathematics, science, and social sciences) are required to make up the deficiencies by completing appropriate credit course work at a University System institution. In an effort to assess the impact of CPC, independent of high school grade point average (GPA) or Scholastic Aptitude Test scores, a study was conducted comparing the academic persistence, GPA's, credit hour completion, and transfer activity of full-time, first-time freshmen students at a 2-year unit of the University System, namely Gainesville College (CG) who were either CPC-completers or CPC-deficient. The study population included 1,205 students (719 CPC-completers and 486 non-completers) who entered GC during the fall quarters 1988, 1989, and 1990 and who had graduated from high school the previous June. A subset of 369 fall 1988 entrants were followed over a 3-year period to measure their transfer activity to senior institutions. The study determined that CPC completers earned higher first year GPA's and more first year credits, had (among males) higher quarter-to-quarter persistence rates, and were more likely to transfer to a four-year school within 3 years of entrance to GC than CPC non-completers. In addition, the study concluded that college advisement efforts were enhanced by identifying CPC-deficient students as potentially high-risk. An in-depth review of the literature and the related educational legislation, data tables, and a 154-item bibliography are included. (PAA)

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# IMPACT OF GEORGIA'S COLLEGE PREPARATORY CURRICULUM ON ACADEMIC SUCCESS AT GAINESVILLE COLLEGE

by

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DR. JOHN M. HAMILTON
Impact of Georgia's College Preparatory Curriculum on Academic Success at Gainesville College


## ABSTRACT

Too many students graduate from high school and arrive at college without adequate preparation to undertake the rigors of college-level work. Georgia, like some other states, has responded to this problem by promoting policies designed to improve the academic readiness and quality of students as they enter higher education. In 1984, the Georgia Board of Regents mandated that all high-school seniors graduating in the spring of 1988 or later complete a prescribed college preparatory curriculum (CPC) before they enter a University System institution as regular placement freshmen. Incoming students with deficiencies in one or more of the five CPC areas (English, foreign language, mathematics, science, and social sciences) must make them up by completing the appropriate institutional credit course work, thus increasing the number of hurdles they must overcome as they pursue their higher education. This study attempts to assess the impact of the CPC, independent of high-school grade-point average and SAT scores, on the academic success of full-time first-time freshmen students at a two-year unit of the University System. Several outcome measurements compare CPC-completers versus students with CPC-deficiencies: persistence, grade point average, and credit hour completion. In addition, the transfer activity to a senior

college or university is investigated over a three year period for those students who entered the two-year college during the fall of 1988. Data indicate that completing Georgia's CPC in high school lends matriculating students a moderate academic edge in terms of earned credits over the first academic year, one-year persistence for males, and transfer activity. College advisement is enhanced to some degree by identifying CPC-noncompleters as potentially high-risk students. Moreover, the CPC guidelines provide high-school counselors and faculty with a means to encourage students to make curricular choices more consistent with a prescribed set of pre-college courses. It is also likely that the CPC contributes to higher SAT scores and high-school grade averages which in turn serve as good predictors of academic success in college. Lastly, the CPC, however imperfect, provides a tool that can be manipulated to best serve the educational needs and aspirations of those bound for college. Findings from the study should help policy-makers discern whether the CPC policy is achieving its desired goals in a cost-effective manner and how to better articulate high-school curricula with college expectations.

INDEX WORDS: College Preparatory Curriculum, Two-Year College, Assessment, Transfer

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TABLE OF CONTENTS

ACKNOWLEDGEMENTS . . . . . vi

LIST OF TABLES . . . . . x

LIST OF FIGURES . . . . . xiii

I. INTRODUCTION . . . . . 1

Statement of the Problem . . . . . 6

Purpose . . . . . 7

Significance . . . . . 8

II. REVIEW OF THE LITERATURE . . . . . 10

Introduction . . . . . 10

Call to Upgrade Secondary Preparation and Admissions Reform . . . . . 12

College Preparatory Curriculum: General Features . 18

High-School Preparation for College and Scholastic Aptitude . . . . . 21

Measures of College Success . . . . . 27

Development Studies . . . . . 35

The Transfer Phenomenon at Two-Year Institutions . 43

The CPC Mandate in Georgia . . . . . 60

CPC and the University System of Georgia . . . . . 64

The Impact of Georgia's CPC at a Public Research University . . . . . 71

Conclusion . . . . . 73

III. RESEARCH DESIGN . . . . . 77
Theoretical Model . . . . . 77
Method . . . . . 81
Population . . . . . 81
Variables and Their Indicators . . . . . 86
Data File Construction . . . . . 91
Analytical Procedures . . . . . 94
IV. RESULTS . . . . . 98
Bivariate Analysis . . . . . 98
One-Year Study: Multivariate Analysis . . . . . 107
Three-Year Transfer Study . . . . . 120
Limitations . . . . . 125
V. CONCLUSIONS AND IMPLICATIONS . . . . . 130
Summary . . . . . 130
What is Embodied in the CPC Codes? . . . . . 136
Developmental Studies . . . . . 142
Transfer Activity . . . . . 144
Future Research . . . . . 147
Conclusion . . . . . 151
REFERENCES . . . . . 157
APPENDIX . . . . . 178

## LIST OF TABLES

Table 1. Students in One-Year Study by Sex, Race, and CPC Classification (N=1205) . . . . . 83

Table 2. Transfer Study Students by Sex, Race, and CPC Classification (N=369) . . . . . 84

Table 3. Unsatisfied CPC Areas for Students in One-Year (N=1205) and Transfer Studies (N=369) . . . . . 85

Table 4. Multiple Unsatisfied CPC Areas for Students in One-Year (N=1205) and Transfer Studies (N=369) . . 86

Table 5. Control and Intervening Variables and Their Coding Scales, Means, and Standard Deviations for the One-Year and Transfer Study Students . . . . . 87

Table 6. College Preparatory Curriculum Variables and Their Coding Scales, Means, and Standard Deviations 88

Table 7. Success Variables and Their Coding Scales, Means, and Standard Deviations: Cumulative Freshman GPA, Earned Credits, and Persistence . . . . . 90

Table 8. Transfer Success Indicator and Its Coding Scale, Mean, and Standard Deviation . . . . . 91

Table 9. Differences between CPC-S and CPC-NS students on SAT Scores, High-School Averages, and Cumulative Freshman Grade Average . . . . . 100

Table 10. Developmental Studies Placements for CPC-S and CPC-NS groups. . . . . 101

Table 11. Earned Credits Over One Academic Year by Credit Hour Categories for CPC-S and CPC-NS Students. . . . . 103

Table 12. One-Year Persistence Patterns by Quarter for CPC-S and CPC-NS Groups. . . . . 104

Table 13. Three-Year Transfer Activity to Baccalaureate-Granting Institutions for the CPC-S and CPC-NS Students who Started at Gainesville College During the Fall of 1988. . . . . 106

Table 14. Pearson Product-Moment Correlation Coefficient Matrix for Control, CPC, DS, and Success Variables. 108

Table 15. Regressions for the CPC Causal Model: DS, Freshmen Cumulative GPA, Earned Credits, and Persistence . . . . . 110

Table 16. Summary of Effects of Independent Variables on Cumulative Freshmen Grade Average, Earned Credits After One Academic Year, and One-Year Persistence for the Male and Female Subsamples. . . . . 118

Table 17. Direct, Indirect, and Total Effects on GC GPA, Earned Credits, and Persistence. Indirect Effects through Developmental Studies. . . . . 120

Table 18. Pearson Product-Moment Correlation Coefficient Matrix for Control, CPC, DS and Three-Year Transfer Rate. . . . . 122

Table 19. Full CPC Causal Model Analysis: DS and Three--Year Transfer. . . . . 123

Table 20. Direct, Indirect, and Total Effects for Transfer Study. Indirect Effects through Developmental Studies. . . . . 125

## LIST OF FIGURES

Figure 1. Theoretical causal model for CPC effects on college outcomes in the context of other independent variables . . . . . 70

Figure 2. Significant path analysis results for one-year persistence, cumulative freshmen grade-point average, and completion of college credit (N=1205) . . 111

Figure 3. Significant path analysis results for transfer to a baccalaureate-granting institution within three years of entering Gainesville College (N=369) . . . 124

## I. Introduction

The public was rudely awakened by "A Nation at Risk." This biting report by the National Commission on Excellence in Education (1983) contended in vivid language and imagery that secondary schools were not graduating sufficient numbers of students who were prepared for college-level work. College applicants were lacking in both aptitude and knowledge base in the key subject areas of English, foreign language, mathematics, natural sciences, and social studies. The now familiar phrases "rising tide of mediocrity" and "unilateral educational disarmament" were incorporated into the report's charge that the quality of education had declined sharply in the United States.

Buttressing this "crisis" is the continued slide of SAT verbal scores, the lack of improvement of SAT math scores (College Board, 1990) and the large numbers of college freshmen enrolled in expensive remedial courses (Preer, 1983; SREB, 1991). For example, about 35 percent of the first-time freshmen attending public colleges and universities in the Southern Regional Education Board (SREB) states in the fall of 1988 were enrolled in at least one remedial course (SREB, 1991). It is germane to the discussion that the Atlanta Constitution (Tuesday, August 27, 1991) recently

ran a front-page article entitled "Class of '91 marks worst score on verbal SAT; math drops,too." The newspaper article reports that the declines are the worst in eight years and indicative of too few students taking tough college preparatory courses according to College Board president Donald Stewart. Significantly, the paper notes that Georgia was one of only three states in which the performance of rising seniors on the SAT did not decline. Perhaps, Georgia is doing something right.[1]

This concern for educational quality has not been confined to the public pre-college sector. Several agencies (PEPC, 1989) and blue-ribbon commissions to include the National Research Council (1989) and the National Science Foundation (1989) have issued policy reports which promoted renewed emphasis on the undergraduate experience based on the contention that in recent years the graduates of some institutions of higher education in the U.S. seem to lack the academic skills and knowledge traditionally expected of

---

[1] SAT scores are useful in making decisions about individual students and assessing their academic preparation. Using these scores in aggregate form as a single measure to rank states is invalid because the percentage of SAT takers varies widely among the states and the test takers are self-selected. For example, in some states few college-bound seniors take the SAT and they typically have strong academic backgrounds and apply to selective schools and scholarship programs. In general, the higher the percentage of students taking the test, the lower the average score. A common test would have to be administered to make useful comparisons of students' performance between states. Nevertheless, aggregate data can be useful to states to track trends and as one indicator of educational quality (CEEB, 1988).

college graduates. Critics have attributed this to problems with the academic preparedness of entering freshmen, grade inflation, poor communication between high schools and colleges, a fragmentation of learning into narrow disciplines with a loss of a common sense of purpose or goals for the undergraduate experience, the inability to determine a college's success in fulfilling its mission, and a lowering of expectations of student performance at certain institutions. Significant efforts are on-going to review, revise, and assess the structure of the undergraduate curriculum. Much activity has involved the strengthening of general education requirements, an extension to some degree of the high school academic core (El-Khawas, 1990; Boyer, 1987).

The consequences of an undereducated citizenry are manifold. A SREB (1989) report entitled *Trends: Education, Employment, Population. Challenge 2000* predicted that the nation would experience dramatic changes during the 1990s in employment opportunities and the labor force that will favor those who have postsecondary training. The SREB report goes further to suggest that if current educational trends continue, the future for the region might have to address the following issues: (1) Too few students will be ready for the first grade and too few will graduate from high school; (2) minority students will continue to have lower levels of academic achievement, higher dropout rates, and lower levels of literacy than their white counterparts; (3) college enrollments will decline and the disparity in the rates at

which black, Hispanic, and white students attend college and earn degrees will continue, and (4) many states, and their citizens, will not be prepared for the jobs requiring higher skills that are projected to be available. This prospect for a future was deemed unacceptable by SREBs Commission for Educational Quality. Improved employment and higher standards of living in the years to come depend on a concerted effort to alter these educational trends.

Clearly, the state of higher education in the United States is one that deserves close attention and appropriate funding if our present standard of living is to be maintained in the face of increasing global competition. New challenges and expectations confront higher education today - challenges related to broad social and technological changes, and expectations that education must be a part of meeting these challenges. Achieving educational goals will require a smooth articulation between all levels of schools, with perhaps particular emphasis on making sure that rising seniors are capable of succeeding in college. The preparation of students during their high school years is a critical concern and the climate is ripe for demonstrable change with assessable outcomes.

Beginning in summer quarter of 1988, the Board of Regents required the College Preparatory Curriculum (CPC) of all regular freshmen entering any institution of the University System of Georgia. The CPC requires a minimum of four units of English in high school, three in mathematics, three

in science, three in social science, and two in a foreign language. If a student has not satisfied the CPC requirements in either English or math, he or she is required to take the Collegiate Placement Exam (CPE). Depending on the CPE score, the student would either exempt or be placed in developmental studies (as is explained later, students with low SAT scores who satisfy the CPC requirements in mathematics and English may place into developmental studies). A student who has an unsatisfied CPC area in science and/or social science is required to remove that requirement by earning a 'C' or better in a five quarter-hour college-level course before completing 45 credit hours. In the case of a foreign language CPC requirement, the student at Gainesville College is required to complete a ten quarter-hour foreign language sequence. Any course taken to satisfy a CPC requirement is in addition to the standard requirements, therefore, cannot be counted toward a degree (Board of Regents, 1984; Gainesville College Catalog, 1991-1993).

The college preparatory curricular requirements implemented by the University System of Georgia were imposed to provide a uniform framework of study for those students who expected to exit high school with the advanced learning skills and aptitudes commensurate with college-level work. The policy was designed to raise the level of quality of incoming students' preparation without imposing undue hardships on CPC-noncompleters and without losing sight of the state's commitment to wide access. The policy leads the

optimist to believe that those students who have completed a challenging and rigorous college preparatory curriculum would be advantaged in terms of college success. Furthermore, there is an underlying assumption for the CPC requirement that students who are provisionally admitted to the University System and who take additional coursework in college will "catch-up" with their peers who completed the CPC in high school.

## Statement of the Problem

The crux of the problem is that two-thirds of graduating seniors throughout the state of Georgia do not graduate with a CPC-diploma, yet about 30 percent of them decide to attempt college. In addition, CPC-completion does not guarantee readiness for college as evidenced by the relatively large percentage of completers who require developmental studies in English, reading, and mathematics (Hudson & Pounds, 1989). In order to address the problem of college readiness and improve the articulation between high school and college curricula, the University System is interested in monitoring the extent to which the CPC program prepares students for progression and academic success in college. It is imperative that public schools in Georgia continue to refine and upgrade their college preparatory curriculum to insure that their graduates who matriculate to college have high success rates as indicated by fewer developmental studies needs, higher grade-point averages, and greater

persistence. The need to address the special advisement and coursework concerns of those students who are CPC-noncompleters will be important for some time to come.

Higher education is and should be committed to assisting entering freshmen achieve the aspirations that they bring with them as they begin their college training. One approach is to periodically collect data showing the extent of unsatisfied CPC areas and their impact on student performance. In this way, institutions of higher education that must deal with the problem of underpreparedness can gauge their effectiveness in ameliorating the problem and create and/or modify programs to improve the prospects of these students. The on-going success of this endeavor has implications with regard to mission, curriculum, scheduling, advisement, performance, and leadership.

## Purpose

The purpose of this study is to determine the impact of the college preparatory curriculum on the academic success of entering students at Gainesville College, a two-year unit of the University System of Georgia. Various parameters of student success will be investigated (e.g. retention, Mean GPA, and transfer rate). The results of this study may help higher education to better assess the expected results of a high school curriculum designed to enable students to realize their potential in a college setting. Specific questions to be explored in this study are:

(1) Does full or partial completion of the CPC in high school affect the academic success of students at Gainesville College?

(2) What are the policy and future implications of CPC for Georgia?

(3) Is the CPC a realistic solution to a seemingly intractable problem?

(4) How might the results of CPC assessment studies be used to engage college and high school faculty in a meaningful dialogue about the future expectations and directions of the high school curriculum and the individual roles of schools and colleges?

## Significance

The CPC policy is an effort on the part of the state of Georgia to improve the college-readiness of incoming freshmen. The verdict is still out on whether the effort is an effective solution to the often uneasy transition that students make as they move from high school to higher education. At best, the CPC is an important motivator to encourage students to take appropriate courses early on in high school in order to meet college admissions requirements and to hopefully enhance the likelihood that they will achieve measurable success in college. At worst, it still may be a positive step forward in that it allows for the identification of those curricular areas which high school students did not complete so that the appropriate make-up courses in

college can be levied on the student. The CPC likely contains flaws in design and content. Yet it is a structured curriculum that can be investigated for its strengths and weaknesses and modified if found wanting.

Gaines (1990) aptly emphasized that significant improvements in education do not simply happen. They are planned, pursued, and evaluated. Only by aggressively setting and meeting priorities can states hope to graduate more high school students and increase the percentage of entering college students who are ready for college-level work. Educational improvement, however, does not generally occur in the short-term nor does it occur without some sort of funding. Educational reform by its very nature is an experiment with many players. Its efficacy must be tested over time, then retested again. Substantial and sustained public support predicated on confidence that the system can produce measurable results is required if progress is to be made and sustained, and remade again.

Annual studies of college preparatory curricula which are now being conducted in many states will be beneficial as one means of (1) relating high school performance to college achievement providing a better foundation upon which to build effective policies, (2) allowing colleges and universities to observe the progress of their students from entrance through at least the beginning of the sophomore year, and (3) serving as a guidance and counseling tool at both the secondary and college level.

## II. Review of the Literature

### Introduction

In response to the alarming educational trends and fears of a loss of economic competitiveness, most states in the 1970s and 1980s began implementing new state-mandated admissions standards that stressed prescribed high-school courses as prerequisite to regular status entry to public colleges (Pipho, 1987; Goertz & Johnson, 1985). It was hoped that instituting more selective college admissions criteria would help focus student attention on college early on in their high-school training. In essence, the stricter entrance requirements would encourage students to take a standardized college-bound curriculum, thus minimizing variations in student preparation (Myers, 1982). The measures are not intended to be punitive, rather they are meant to promote a worthy and uniform standard that would guide the course-taking and study habits of high-school students. Ultimately, the true test of the competencies gained through exposure to and completion of secondary courses geared towards college readiness, would be an assessable and measurable increase in student success (Alexander & Pallas, 1984). Despite a growing body of recent research, there is still limited empirical evidence affirming that state-mandated preparatory

curricula in high school lead unequivocally to significantly greater success in college.

It should be stressed that the movement to tighten admissions standards is far from over. State Higher Education Executive Officers (SHEEOs) from all 50 states, Puerto Rico, and the District of Columbia were surveyed in late 1989 for their thoughts on current issues, financial priorities, and legislative concerns (Lenth, 1990). One of the highlighted areas of the study concerned the improvement of undergraduate education. These individuals are key participants in linking state policy makers to institutional academic leaders in setting evolving state policies and providing resources necessary to meet public needs. It is telling that the quality of the undergraduate education is overall the most frequently mentioned and most immediate concern. Results from the study indicate that more than half the states are revising minimum college admissions standards and encouraging improvements in entering student preparation. In addition, state higher education systems are increasingly involved in communicating prerequisites and expectations directly to high schools, students, and families. Fincher (1991) emphasizes the need for strengthening cooperative efforts between secondary and higher education. Measuring the impact of a preparatory curriculum on college success and reporting the findings back to the high schools to guide their continued implementation of it is one step in providing this articulation.

**Call to Upgrade Secondary Preparation and Admissions Reform**

Copperman (1978) determined that the percentage of ninth through twelfth-grade students enrolled in academic courses fell between 1960 and 1972. Over the twelve-year period, high-school students were taking fewer science, mathematics, English, and history courses and in the academic classes they did take there was a gradual erosion of the amount of work assigned and the standard to which it was held. Copperman further determined that the texts used in secondary schools and two-year colleges became more simplistic, written at a level that the average 12-year-old could easily understand. In an effort to abate the deterioration, several states introduced competency or high-school completion tests in the 1970s, and the movement spread in the 1980s. Despite the effort, an alarming number of students continued to complete high school without having risen to the expected level of achievement (Cohen and Brawer, 1989). In 1980 at Miami-Dade Community College, 50 percent of the matriculants were below the eleventh-grade level on reading and writing, 60 percent were below on mathematics, and most felt that their high schools demanded too little of them (Losak, Schwartz, and Morris, 1982). It was apparent that the high-school competency test in Florida could be passed at a level of literacy below that commensurate with the ability to enter college-level studies.

Myers (1982), reporting for the Southern Regional Education Board, maintained that elevating standards at the

admissions gateway into college would provide catalytic incentives for secondary school curricula to change. The driving logic being that raising standards at an end-point in the pipeline would not work effectively unless there was a concomitant change in feeder points further upstream. The two central questions surrounding the reform movement were obvious: Which courses should form the pre-college core?, and What should their content be? Without much dispute and with much precedent, five topical areas were identified for the secondary school core: English composition and literature, mathematics, science, social studies, and foreign language (Thomson, 1983; Tyler, 1987).

By the 1980s, secondary education course-taking patterns began to show welcome evidence of change. Several studies found that college-bound students were taking not only more courses but a higher average number of college preparatory courses (Ramist and Arbeiter, 1986; Goertz, 1989). Goertz (1989) found that whereas there were few differences in course-taking patterns for state-prescribed subjects like English and social studies, course-taking in mathematics, science and foreign language often differed by curricular track and by certain student background characteristics, such as race/ethnicity and socioeconomic status. Goertz reports dramatic increases in the percentage of students taking all the college preparatory mathematics courses between 1982 and 1987.

States that are implementing mandatory college preparatory curricula hope that their reform policies will increase the numbers of students enrolling in higher level courses more in line with a pre-college track. As yet, however, Goertz (1989) has demonstrated that although stricter course work requirements have led to more students taking lower level mathematics and science courses, it has not had the intended effect of increasing course-taking in advanced courses in these areas, especially among students in non-academic curricular tracks. But as the author points out it does not appear that the trend toward increased course-taking has peaked. Steady increases in enrollments in biology and chemistry hold through 1987. And in many states such as Georgia, mandated changes in course work requirements are just now going into effect. In 1986, the Florida legislature, raised admissions standards to the State University System by requiring that high-school graduates have a minimum B average and additional credits in English, mathematics, natural sciences, and social sciences. In addition, the Governor's Education Summit Report in December 1989 called for a reduction in the number of high-school graduates who enroll as first-time community college students requiring basic skills remediation (PECP, 1990).

The course-selection patterns between curricular tracks provides an indicator of the gap that must be scrutinized between precollege and vocational programs. In 1982, data collected from the High School and Beyond Survey showed that

students in an academic curricular track were far more likely to take algebra 2, calculus, chemistry, and physics than were students in a vocational track (NCES, 1984). The differences were striking. For example, 46 percent of academic track students took chemistry compared to 6 percent of vocational track students; for physics the difference was 21 to 4 percent; and for algebra 2 the curricular track difference was 52 to 13 percent. Some high school courses may provide matriculating students with an advantage upon entering college. For example, Advanced Placement English predicts success in the first college English courses while controlling for SAT (Richardson, 1978). Significant correlations were found between high school mathematics and science preparation and college success in physics (Gifford and Harpole, 1986). Advanced high school courses have in some institutions been used to place students into more difficult college courses such as Honors English or an upper-level mathematics course (Suddarth and Wirt, 1974).

Middle school and high-school counselors from Hall County and the Assistant Superintendent for Instruction in the City of Gainesville School System emphasized that one important and *essential* feature of Georgia's college preparatory curriculum requirement is that it acts as an "incentive hammer" which allows them to strongly encourage their advisees to take more rigorous academic courses that they might otherwise avoid (Informal Conversation, March 13, 1992, Office of the Hall County School System; Informal

Conversation, February 12, 1992, Assistant Superintendent for Instruction, City Of Gainesville School System).

Whether the college preparatory curriculum has a discernible effect over and above other factors that influence college success, however, is not clear. The Missouri Coordinating Board of Higher Education began a longitudinal study in 1987 of 15,000 Missouri high-school seniors who attended in-state colleges (Phipps and McDaniel, 1988). The data indicated that fewer than one-fourth of the entering students completed Missouri's definition of a college preparatory curriculum.[2] After controlling for a variety of measured variables, the Missouri precollege curriculum explained less than one percent of the total variance in first term college grades. Most of the explained variance was accounted for by high-school average, ACT scores, and student motivation. The Missouri study also indicated that curricular choices in high school were a poor predictor of persistence into the sophomore year. A 1991 report from the University System of Georgia and a recent study at the University of Georgia (Albright, 1990) detailing the impact of the state's college preparatory curriculum on public higher education is described in later sections.

It should be underscored that many community colleges have open admissions policies that exclude few students from

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[2]Four years of English, three years each of mathematics and social studies, and two years each of natural science and foreign language. The only difference between this and Georgia's is an additional year of natural science.

access to higher education.[3] Discussions of admission standards are essentially meaningless in this context. These colleges do not screen applicants based on any but the most liberal of porous criteria. Gainesville College, a two-year unit of the University System of Georgia, requires only that applicants have a minimum high-school grade average of 1.80 (on a 4.0 scale and on "academic work" only), or an SAT verbal score of 250, or an SAT mathematics score of 280, or ACT English score of 13, or ACT mathematics score of 14 (see Gainesville College 1991-1993 Catalog). Completion of the high-school college preparatory curriculum is not an admissions requirement. The CPC standards then do not constitute a "filter" through which rising seniors must pass to gain admission, rather they comprise a means of identifying those areas in which entering students have not yet demonstrated an acceptable level of exposure and/or competence so that they can be "remediated" with work in college. The assumption is that the make-up courses will strengthen them as

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[3]The literature uses two generic names to refer to two-year colleges: community or junior colleges (Cohen and Brawer, 1989). Junior Colleges were originally conceived as institutions offering the first two years of collegiate-grade insturction. Beyond the 1920s the concept was broadened to a more comprehensive one that encompassed voacational or skill training aspects alongside a general education program. Hence the beginnings of the two-year "community" college. By the 1970s, the term community college was in general use for both types of institutions. Cohen and Brawer define a two-year college as "any institution accredited to award the Associate in Arts or the Associate in Scinece as its highest degree" (p.4). Throughout the literature the term communty college is more prevalent.

students and serve as an effective "bridge" over which they can travel to greater success in college.

## College Preparatory Curriculum: General Features

There perhaps is no better way to illustrate the impetus for secondary curricular reform than to state that more than one in three first-time freshmen in public colleges in the Southeastern states are placed in one or more remedial courses (SREB, 1991; Creech, 1990). This is a result at least in part of the broadening of access to higher education that took place in the 1970s and 1980s which occurred in a simplistic manner by lowering or eliminating admissions standards. The open door for many students has been more of a revolving door, indicated by the low graduation rates at most colleges for the underprepared student (Nemko, 1990).

In an effort to stem the tide of underprepared students and raise the quality of the undergraduate curriculum concomitantly, states have set minimum course requirements for admission to public colleges and universities. Efforts, for example, were made by higher education coordinating boards in Southeastern states to encourage high-school students to enroll in and complete a college preparatory curriculum (Creech, 1990). For the most part, policies on minimum high-school courses required for college include 4 years of English, 2 years of foreign language, and 3 years each of social studies, mathematics, and science.

As might be expected, merely completing these prescribed courses alone will not assure readiness for college. Course content and rigor play a role. It is essential that these courses develop high order competencies in reading, writing, speaking, mathematical and scientific reasoning, and good study skills. For if they do not, too many students will continue to be underprepared for college-level work. A Georgia study showed that, even among the state's 1988 high-school graduates who had completed the CPC in English and mathematics and were enrolled in college programs leading to a baccalaureate, 19 percent required developmental studies in these areas (Hudson & Pounds, 1989).

A brief look at the portion of the Arkansas Higher Education Plan (1989) regarding college preparation demonstrates the level of concern that is evident among many school systems. As the plan points out, many students in Arkansas do not take the courses in high school that are needed to properly prepare for college. Consequently, the percentage of high-school graduates who enroll in state or independent colleges and universities is lower than in most states and many of those who enroll in college do not graduate. This situation might in fact worsen if current trends hold out, since the plan encourages state and independent colleges and universities to further strengthen their requirements for admission and for placement in college-level courses. Because the economic strength of a state depends, to a great extent, on the percentage of adults with educa-

tion beyond the high-school level, Arkansas is committed to improve the academic preparation of its high-school graduates so that more will attend a college or university and will graduate.

The Arkansas State Board of Education has set the following objective: Increase the percentage of high-school graduates in Arkansas who enroll in college from 44% for the fall of 1988 to 50% by the fall of 1994 and reduce the percentage of freshmen placed in remedial courses in the fall of 1994 to at least half of the percentage in remedial courses in the fall of 1988. As for the latter, the Board has stated that the most important way to achieve this reduction in remediation is to persuade students to take a more rigorous set of courses in high school. Only 37% of Arkansas' 1987-88 college-bound seniors took a core distribution of high-school courses. Those who did so scored above the national average on the ACT-Composite and the ACT-Math test.

A college preparatory curriculum is always in a state of flux, and well it should be to keep pace with societal needs in a changing world. As a result, it is necessary to have in place a process to refine the curriculum to best meet the expectations of the college as consumer of the high-school product. Key characteristics, then, of implementing a successful college preparatory curriculum that can evolve over time are severalfold (Creech, 1990): (1) insure that school and college faculties are periodically brought together to

improve methods for teaching the academic skills necessary for success in high school, college, and the workplace; (2) insure that statewide data are available on the mix of courses high-school students actually take by academic, vocational, or general tracks; (3) insure that colleges and universities provide information to administrators of high schools and school districts on their student's performance and success in college.

**High-School Preparation for College and Scholastic Aptitude**

There appears to be senior-year benefits to high-school students who opt for the academic subjects inherent to a college-track curriculum: higher SAT scores and higher high-school grade-point averages and class rank. These precollege measures of achievement reflect positively on subsequent college success and are used in admissions decisions to predict college grades. The strong association between these indices of high-school accomplishment and college performance is evident in the high correlations (greater than .40) between these variables and freshman grade-point average as reported by the College Board (1989). It seems likely that at least some of the impact of the college preparatory curriculum may be expressed through high-school average and scholastic aptitude.

In order to discuss the linkage between high-school course-taking patterns and scholastic aptitude, it is instructive to briefly focus on the concept of aptitude. The

SAT, as much as is practically possible, is a curriculum-neutral prospective measurement of scholastic aptitude as opposed to a retrospective examination of the educational outcomes of specific subject-matter areas as is the case for achievement tests (Angoff, 1976). The concept of aptitude that undergirds the development of the SAT is that of current readiness to undertake college-level work rather than innate ability (Donlon, 1984). Aptitude tests are constructed so as to minimize specific curriculum-based training in favor of potential promise. The SAT measures the degree to which students "can read with depth and comprehension, reason and discern complex relationships, and think critically" (The College Board, 1989, p.2). The generalized verbal and mathematical abilities measured by the SAT are applicable across the wide-ranging undergraduate curriculum. Fincher (1986) notes that the SAT can be thought of as an outcome of secondary education.

According to the College Board's Technical Manual (Donlon, 1984), content on the SAT is restricted to topics to which most high-school students are presumably exposed. Test item formats include analogy, antonym recognition, and quantitative comparisons. Questions emphasize process skills such as the capacity to reason with specific information rather then memorization and the questions are specifically designed to measure a quality that is related to some phase of college work. The language used on the SAT is similar to that used in college texts (Carrol, 1980). For example, the

easier SAT antonyms tend to be based on words that appear in college text samples at the rate of one in a million words, while the harder antonyms appear once in 10 to 100 million. SAT-verbal scores correlate positively with the degree of antonym difficulty. It is reasonable to assume that students completing college preparatory courses would be more likely to encounter and remember the meaning of college-level words better than students who did not satisfy all the requirements of a precollege track. In addition, Chall (1977) has determined that the difficulty of the reading comprehension components of the SAT were consistently near the college level (11 to 12 grade level). The study concluded that the more rigorous and college-oriented the school reading program, the higher the SAT score.

The dimensions of learning measured by the SAT are emphasized more heavily in the lengthier set of objectives associated with college preparatory courses than with the more applied courses in a vocational curriculum (Georgia Board of Education, 1988). Moreover, the College Board stresses that their studies indicate that although the curricular paths of students can be diverse, performance on the SAT is enhanced if students study academic courses and include college preparatory mathematics.

Despite that the SAT is not curriculum-based, success on the test depends in part on past academic achievement. The College Board's (1991a, 1991b) annual report that profiles college-bound seniors shows that a clear and unequivocal

relationship exists between high-school preparation and achievement and SAT scores. The greater the number of academic subjects and the better the high-school record (high-school grade average and/or class rank), the higher the mean SAT score (Ramist and Arbeiter, 1986). The College Board cautions, however, that interpretation of the profile data should take into account the complex and interdependent relationship between SAT scores and other student characteristics (educational, demographic, and socioeconomic). The relationships are associational and not necessarily causal.

The likelihood of a positive relationship between Georgia's college preparatory curriculum and SAT scores is strengthened by several lines of evidence. First of all, the bulk of the 15-course college preparatory curriculum has been completed by the time students enter their senior year. Secondly, the majority of students report scores from SATs taken during their senior year in high school (e.g. the most recent scores for 83.0% of the Georgians in the 1991 College Board Georgia Report were from the senior year). The Executive Director of Curriculum for Hall County from which Gainesville College draws about 40 percent of its first-time students verifies that most high-school students in Hall County take the SAT during the fall quarter of their senior year (phone conversation, April 10, 1992).

The third point to consider is that scholastic aptitude as measured by the SAT develops over a number of years. A longitudinal study by Hilton (1979) using the School and

College Ability Test demonstrated that verbal and quantitative skills improved between grades 5 and 11, although the rate of improvement seemed to slacken for some students by the eleventh grade. Remarkably, since all skills tended to increase by similar amounts, significant changes in a student's relative position were atypical and fifth grade scores were highly correlated (.70 to .80) with eleventh grade scores. Beyond the eleventh grade, there is evidence that SAT scores change relatively little from the junior to the senior year with an average gain for students who attempted the test twice of 12 points each for the verbal and mathematics scores. It should be added that 35 percent of those who repeat receive lower scores. Several factors contribute to the small average SAT score gain (1) intellectual growth, (2) students who score low initially tend to increase their score, and (3) test familiarity (Alderman, 1981).

The above discussion is not meant to imply that high-school curriculum is the only contributor to performance on the SAT. There are others. For example, there is a well documented positive relationship between average SAT scores and total years of parental education and median income (Ramist and Arbeiter, 1986). Better educated parents with above-average incomes are more likely to have college expectations of their children, spend money on educational and cultural activities that enhance educational achievement, and encourage their children to do well in school. Minority

status and gender also influence SAT scores. Blacks score significantly lower on the SAT than whites (a 64 point gap on the total SAT score in 1991). Women have lower average scores than males. Of interest to the current study is the suggestion that one of the reasons males and whites score higher than females and Blacks is that on average they study slightly more academic courses (i.e. biological and physical sciences, English, foreign language, mathematics, history, and social studies) in high school (Ramist and Arbeiter, 1986). A 1988 study by Burton, Lewis, and Robertson, however, found that when adjusted for ethnic group, socioeconomic status, high-school curriculum, and intended college major, the gender differences in SAT scores were reduced.

In addition, it should be recognized that the verbal and mathematical abilities measured by the SAT are only two of a number of qualities that might be considered scholastic aptitude. The College Board's technical manual (Donlon, 1984) mentions others that are no less valid but much more difficult to accurately measure on a large scale: originality, industriousness, and perserverance. As Cameron Fincher (1986) aptly points out, there is no perfect control variable to fully explain college grades. Educators should be relieved that the predictive contribution of the SAT and high-school average to college grades is no higher. The magnitude of the unexplained variance is "educationally healthy" and leaves ample room for colleges to provide an

assessable form of a value-added education that their programs purport to deliver (p. 78).

## Measures of College Success

In order to assess the effectiveness of a college preparatory curriculum as an entrance requirement to regular college admission, it is necessary to have some measure(s) of academic achievement. Success in college has many dimensions and is difficult to tackle without at least some concerns of ambiguity. Nevertheless, one can apply those measures that are relatively easy to obtain and are traditionally held to be accurate "yardsticks" of student progress: grade averages at the end of the freshman year and enrollment persistence into the second or sophomore year after initial matriculation. In addition, earned credit hours within the first-year of study can serve as an indicator of the progress students are making towards their educational goals.

Of the indicators of student outcomes, the best and most easily available measure of college success seems to be grade-point average at the end of the freshmen year (Donlon, 1984; Kanarek, 1990; Schoenfeldt & Brush, 1975). First-year college grades are likely the "single most revealing indicator" of a student's adjustment to the intellectual demands of a given course of study and mirror positive work habits and attitudes (Pascarella & Terenzini, 1991). Numerous

studies have documented the association between high-school record and SAT scores and freshman grade-point average.

In the majority of the 685 college validity studies reported on by Donlon (1984) on entering classes from 1964 to 1981, data indicate that the high-school record is the best predictor of freshman grade-point average, but combined SAT scores are not far behind (e.g. in 34% of 685 studies, combined SAT scores contributed more to the prediction than high-school record). The mean correlation coefficient for high-school record was .48, while that for the SAT sum was .42. The SAT in combination with the high-school record improves the accuracy of prediction of college grades by 15 percent, raising the overall correlation to .55. The average improvement would be even greater if not for the restriction of SAT range by student and institution selection that tends to lower the observed correlation of the SAT with college grade-point average. When the slopes were standardized (stated as beta weights) for the regression of high-school record and SAT sum on freshman grade-point average, the proportion of the total weight attributed to the two independent variables was 46 percent for SAT scores combined and 54 percent for high-school record.

Through 1988, high-school record correlations with freshman grade-point average have remained about the same. Fincher (1986) speculates that high-school average is the best single predictor of learning outcomes as measured by college grades, since it is likely that it shares many

similarities with faculty judgments concerning college grading practices. SAT score correlations have for the most part declined, especially at those institutions with an SAT total mean below 850 (less selective colleges) which have higher part-time student percentages and greater numbers of entering students in remedial programs (Ramist and Weiss, 1990).

A review of validity studies by gender from 1964 to 1981 by Donlon (1984) indicated that SAT contributes more to the prediction of college grades of females than males. Similar findings were reported by Fincher (1986) for the University System of Georgia. Furthermore, women usually obtain higher freshman grade averages for given levels of SAT scores and high-school record (Linn, 1973; Morgan, 1989). The finding of sex differences may be due in part to differences in the selection of courses by men and women. Women tend to take fewer quantitative-oriented courses with more lenient grading policies than men (Goldman and Hewitt, 1975). Further speculation by Caldwell and Hartnett in a 1967 study at the University of South Florida suggested that the higher course grades women received may have been related to such personal qualities as a greater motivation for high achievement, punctuality in turning in assignments, neatness of work, and regular attendance. Breland and Griswold (1982) found that women received higher scores than men on essay tests for the simple reason that "they write better" (p.720).

The efficacy of SAT scores and high-school record as indicators of grade-point average extends beyond the first year. A 1983 comprehensive review of 21 studies by Wilson indicated that preadmissions measures of SAT test scores and high-school record are valid for predicting cumulative grade-point average through the senior year. Wilson notes, however, that the relationship between preadmissions measures and college grade-point average decreases over time. The author also determined that the best predictor of grade-point average is the cumulative grade-point average up to that point.

Considerable research has also been applied to persistence. Persistence into the sophomore year is the one measure of success that is most often cited in addition to grades (Terenzini & Pascarella, 1984; Tinto, 1987). The relationship between persistence and preadmissions measures is problematic since the rate depends on the time period of persistence, the dropout and stopout rates of different colleges, and the variables included in the model. Persistence, however, is consistently linked to the experiences of the student in high school. Ramist (1981) showed that precollege academic factors such as grades and class rankings bear significantly and positively on rates of attrition. In addition, he showed that the program of study taken by a high-school student had a major impact on retention prediction with years in English, mathematics, and foreign lan-

guage being significant measures. Years of study in social studies and biology were unrelated to persistence.

In his longitudinal study of 41,000 undergraduates which surveyed students at their different points of entry and four years later, Astin (1975) found that the characteristics of persisters changed at two points. The important entering characteristics for persisters were students' high-school grades, degree aspirations, religious background, good study habits, high expectations about academic performance in college, highly educated parents, and marital status (being married for males and being single for females). Four years later, the important characteristics were good grades, being single for females, being childless for males, living in a college resident hall, having a part-time as opposed to a full-time job, involvement in extracurricular activities, and parental support.

Willingham and Breland (1982), defining persistence as the return of students in the fall quarter of their sophomore year, found correlations between high-school rank and persistence at nine colleges was .03, whereas the corresponding value for the combined SAT score was .08. The complexity of predicting persistence was evident in the overall correlation of .15 for their multiple regression model which combined SAT score and high-school record with eight other personal quality measures of achievement, background, and educational goals. The authors concluded that persistence is related to the college attended and is diffi-

cult to predict well by standard or personal quality measures.

Although the literature from the two-year sector is not as rich as that from senior colleges and universities it shares many similarities and is perhaps more insightful with respect to the idiosyncracies and dynamics of the community college environment. Lucas (1986) analyzed the transcripts from random samples of 200 full-time students who entered William Rainey Harper College, a two-year school in Illinois, between 1974 and 1984. The study revealed that, on average, about 20 to 30 percent of the full-time students never returned after the first year of enrollment. Students earned about 25 credits after the first year, 40 after the second, 43 after the third, and from the fourth year on the mean cumulative hours passed for those still enrolled was around 45. Their data indicated that the curve representing credit hours generated tended to flatten out after the third year.

Overall, community college students as compared to students at four-year colleges are characterized by those attributes that the literature associates with lower persistence rates: they have less academic aptitude, less certain plans for the future, less ambition to achieve a baccalaureate degree, and are less likely to attend full-time (Cohen and Brawer, 1989). Thus it is not surprising that community college entrants are 10 to 18 percent more likely to drop out of college in their first two years than are four-year

college students of similar background, ability, and aspirations (Dougherty, 1992).

In keeping with Tinto's (1974; 1987) theories of academic and social integration, Dougherty (1992) asserts that the key institutional factor that increases college withdrawal is the weaker ability of the community college to integrate its students into the life of the institution. As a result, some students experience a poor fit with the institution which in turn precipitates low attendance, poor college grades, little contact with faculty, few friends on campus, and a lack of a sense of intellectual development. Community college students are less involved in extracurricular activities and extra-academic contact with faculty (Chapman and Pascarella, 1983). Community college students are likely to commute and living on campus has been found to have a positive effect on student's persistence into the sophomore year (Anderson, 1981, 1984; Astin, 1975). On-campus residence contributes to wider contact with faculty and students, greater involvment in campus activities, and deeper satisfaction with campus life. This greater social integration contributes to staying at the institution.

Dougherty (1992) speculates that community colleges are less likely to academically integrate their students due to the prevalence of their open-enrollment admissions policy. The lack of academic selectivity can create reduced expectations and less encouragement among faculty towards students who they perceive as lacking academic ability and motivation

(London, 1990). Another ramification that can result from a lack of selectivity is the presence of peers who may not be interested in or good at academic work and discourage those who are (London, 1990; Neuman and Reisman, 1980; Weis, 1985).

Tinto (1987) theorized that the decision to stay or drop out of college is influenced initially by the student's pre-enrollment characteristics and, once on campus, by the student's integration into the social and academic communities at the college or university. Tinto maintains that student persistence in college is a reflection of their personal attributes and experiences within the institution. Although the characteristics of the students are important, what happens after they enroll in the college appears to have a greater impact on persistence.

Both Tinto (1987) and Lenning (1982) emphasize that prematriculation characteristics and the initial intent of students regarding educational participation are strong predictors in determining persistence or withdrawal of students. Lenning (1982) states that "the degree of congruence or discrepancy between what the student expects from college and the reality of the college environment may be a major factor in persistence/withdrawal behavior" (p.40). Bean (1982) stated that although a relationship has been established between intentions at entry and subsequent departures, very few institutions question their incoming students about the nature of their educational intentions.

By the same token, CPC choices during high school reflect the intent of a student, however premature, to enter college. Students who choose not to adequately prepare for college find that it is in fact quite difficult when they finally decide to commit to a rigorous academic environment for which they may be underprepared.

There are many complex factors that intervene in the college experience of a student beyond the freshman year to affect continued enrollment at the originating institution - social integration, racial composition, advising and counseling services, residence facilities, extracurricular involvement, choice of major, interactions with faculty, and financial aid (see Pascarella and Terenzini, 1991). As a result, it is difficult to ascertain whether a variable such as the completion of a preparatory curriculum in high school has much influence in or beyond the first year of college.

## Development Studies

Remedial, compensatory, and developmental are the most widespread terms for courses designed to teach literacy - the basics of reading, writing, and arithmetic. Developmental studies programs in higher education are designed to address many issues such as cultural pluralism, access, and equity. They provide supportive environments that focus on the processes of learning as well as the content to be mastered. The intent of all the compensatory activities (developmental courses, counseling, peer and faculty tutors,

learning laboratories, study skills seminars, and a variety of special interventions) is to keep students in school and to help them improve their basic skills so that they can complete an academic or vocational program at the postsecondary level (Cohen and Brawer, 1989). The developmental concept makes a concerted effort not to stigmatize students and begins from a platform that assumes students can succeed regardless of the learner's background and previous academic achievement (Higbee, 1991; Clowes, 1982).

Developmental Studies programs are not new to the nation's postsecondary institutions. Many colleges were founded during the nineteenth century before the development of a widespread secondary school system. Confronted with a dearth of qualified applicants and competition for students, institutions lowered their admissions standards. Rudolph (1977) noted that early on in the 19th century, college authorities "learned to restrain their expectations in deference to the preparation of the students who came their way" (p.60). By the latter part of the nineteenth century, most of them were operating their own compensatory education programs. In 1895, 40 percent of entering students were drawn from the preparatory programs operated by the college and universities themselves (Rudolph, 1977).

The legacy of underpreparedness continues and of all the postsecondary educational structures in America, the public community colleges have borne the brunt of the poorly prepared students in the twentieth century. For example, of the

students entering New Jersey community colleges in 1985, 46 percent were identified as needing remediation in verbal skill, 58 percent in computation, and 77 percent in algebra. Not surprising, these percentages were considerably higher than comparable figures for those entering the state colleges or the state university (New Jersey State Department of Higher Education, 1986). A recent report by Florida's Postsecondary Education Planning Commission (1990) indicated that in the Community College System, approximately half of the students who have applied for a degree program have not met standards for college-level mathematics, and one-fourth have not met the standards for writing and reading. Institutional research demonstrated that fewer than half of the students needing developmental studies in college actually completed their prescribed courses. The Information Digest: 1989-1990 published by the Board of Regents of the University System of Georgia noted that almost 19,729 students (representing 11.5% of the total Systemwide enrollment) were enrolled in Developmental Studies programs during the fall of 1989. A breakdown of these developmental studies students indicates that they accounted for 39 percent of the freshman and sophomore unduplicated headcount enrollment at the state's two-year institutions, while representing only 8 percent of the same enrollment at the state universities.

The degree of underpreparedness of entering freshmen is large in magnitude and not restricted to any state or region of the country. According to the U.S. Department of Educa-

tion (1985) approximately 82 percent of all institutions and 94 percent of public institutions offered some type of remedial assistance by 1984. A 1987 survey by the Southern Region Education Board (SREB) indicated that most of the 21 responding southeastern colleges had one-fourth to three-fourths of their entering full-time students needing remediation in math and one-fourth to one-half of the students needed reading and writing remediation at one out of two. The survey indicated that remedial students complete their programs of study at low rates. At five of the colleges, the completion rate for developmental studies was less than 25 percent. In many cases, students would exit specific developmental courses, but fail to pass the corresponding college-level course.

Many factors influence students' abilities to progress successfully through remedial work and into college-level courses. An important factor is the number of developmental subject areas requiring completion. Research conducted at Miami-Dade Community College and Broward Community College revealed that the more remedial work students need, the less likely they were to persist and ultimately graduate (Broward Community College, 1989; Losak, 1983; Losak, 1986; Belcher, 1989). Data also indicated that students who successfully completed all the developmental studies areas in which they were underprepared had persistence rates comparable to those for students who began with no skill deficiencies (Broward Community College, 1989; Losak and Morris, 1985). This

positive finding is tempered by the disturbing fact that at both Miami-Dade and Broward, less than half the students needing developmental coursework actually completed their prescribed courses.

Belcher (1989) found that the three-year graduation rate at Miami-Dade (from fall 1982 to fall 1985) was directly related to the number of developmental studies areas into which entering full-time students placed: Twenty-six percent of those students without developmental studies needs had earned an associate degree within three years, while the rates for those with one, two, and three developmental studies areas were 11 percent, 5 percent, and 1 percent, respectively. In addition, findings suggested that students who did well in their remedial courses tended to do satisfactorily in the respective college-level courses. However, those who passed developmental courses with average grades were not necessarily prepared to successfully pass the corresponding college-level course on their first attempt. Similar findings have been reported at Gainesville College. Students who exited Developmental Studies mathematics with a 'C' were less likely to pass college algebra on their first attempt then those students with a 'B' or better (Fuller, 1989).

The low pass rates for remedial students do not necessarily reflect the extent to which institutions attempt to assist these high risk students. Academic support services to supplement basic skills coursework is widespread among

colleges as evidenced by the results of a 1987 SREB survey. Twenty-one responding institutions indicated the following services: peer tutoring (offered by 76% of the responding institutions), faculty tutoring (57%), additional diagnostic testing (86%), special counseling available (90%), and assistance laboratories and learning centers at all but one of the colleges. In sum, support services were widely used by the responding institutions, although there was great variation in their effectiveness as perceived by the colleges. The most widely used and most effective were counseling and learning laboratories or centers. The level of attention provided developmental studies programs and their students is expensive. The State Board of Community Colleges in Florida (PECP, 1990) estimates that the cost of instruction per full-time equivalent (FTE) student in developmental studies is about twice as much as the cost per FTE student in traditional college courses. Instruction in the case of high risk students is labor intensive, often requiring one-on-one teaching and special facilities in order to increase student retention and completion. The report concludes that any program to reduce the number of students who need remediation would be of educational and economic value.

In the early 1970s, the Board of Regents of Georgia determined that any graduate from a Georgia high school should have the opportunity to pursue a program of college study within the University System. In recognition of the underpreparedness of many entering freshmen, the Board of

Regents mandated that all institutions within the System establish a program of Special Studies (changed to Developmental Studies Fall 1981) to provide academic support services to enhance those skills necessary to succeed in regular college courses. Developmental studies is an all-pervasive and dominating theme at Gainesville College. In the fall of 1990, for example, over 25 percent of the total student body was classified as developmental studies (i.e. requiring one or more developmental courses) (Gainesville College Fact Book, 1990-1991).

The Developmental Studies program began at Gainesville College in the fall of 1974 as a means of bringing the reading, English, and mathematics skills of marginally prepared students up to a college standard. Students scoring below either 400 SAT-Verbal (21 ACT-E) or 420 SAT-Math (19 ACT-M) or students who do not meet the institution's standards for regular admission are required to take the appropriate part(s) of the Collegiate Placement Exam (CPE), an achievement test developed by the University System of Georgia, to determine whether they are to be placed in developmental studies or in credit course work. Students may accumulate up to 30 hours of credit while classified as a developmental studies student and taking developmental studies courses, but may not take degree credit courses which require the content or skills of the developmental studies course which has not been successfully completed. No degree credit may be awarded in developmental studies, but

institutional credit is awarded (Gainesville College Catalog, 1991-1993).

Developmental Studies students have SAT verbal and math scores that are lower than regular placement students, lower retention and three-year graduation rates, accumulate fewer earned credit hours within the first year of study, and have lower Gainesville College grade-point averages (Gainesville College Fact Book, 1991-1993; Gainesville College Developmental Studies Annual Report, 1990-1991). Placement in developmental studies, when viewed alone, negatively impacts the success of students at Gainesville College.

Entry into developmental studies is contingent on SAT scores and performance on the CPE. Developmental studies placement is not a function of whether a student has completed the CPC and it is significant to note that throughout the System 19 percent of 1988 students with a CPC diploma placed into developmental studies courses. In contrast, 73 percent of the 1988 students who entered with unsatisfied CPC areas were placed into Developmental Studies (Hudson & Pounds, 1989). The relationship of CPC completion to developmental studies status is problematic in that one would expect that the CPC would uniformly improve the academic preparation of entering completers such that they would exempt these courses. The proposed study intends to investigate whether the CPC curriculum, after controlling for SAT scores and high-school grade-point average, decreases the

prospect that a student will place into developmental studies.

**The Transfer Phenomenon at Two-Year Institutions**

During the 1960s and 1970s, few questioned the open access policy at two-year institutions and fewer still demanded accountability with respect to the success of transfer programs and subsequent baccalaureate attainment. During the 1980s, the transfer function came under greater scrutiny, since many came to the conclusion that easy access to higher education could be justified only if it led to genuine achievement of student aspirations. Virginia, for example, recently enacted state regulations requiring each community college to develop a comprehensive student assessment encompassing evaluation of academic progression to include entrance, graduation, and university transfer (Roessler, 1988). Whether students eventually transfer is an ever more important issue in light of the increasing number of Americans who depend on two-year insitutions as their point of entry into higher education. In 1989, community colleges enrolled more than 5.7 million of the nation's 13 million college and university students - 43 percent of the total higher education student population (ACE, 1991). Although the increased emphasis on transfer and stiffer academic requirements is generally perceived as good, there is concern that the heightened attention to the transfer function may impose an elitism on the community college and compro-

mise its historic commitment to the educationally neglected and its comprehensive identity (Cross, 1990; Grubb, 1990).

Despite the importance of transfer education as a major component of the two-year college, few institutions can reliably document the effectiveness of this function. Consistent data are difficult to find, even though such information would serve as an indicator of accountability and a means of self-assessment (Brawer, 1991). The lack of accurate data on student goals and the often *ad hoc* progression of students toward these goals leaves community colleges vulnerable to misconceptions about their effectiveness. The paucity of state and locally-based longitudinal studies in the literature points to a potentially large gap between the information demands of policy makers and the research capacity of community colleges (Palmer, 1990).

Detailed studies of transfer patterns from community colleges to senior institutes are difficult to undertake for a number of reasons. Such studies (1) often involve exhaustive, time-consuming searches through transcripts, (2) might involve questionnaire formulation, distribution and analysis, (3) find it difficult to define various student populations to follow (e.g. full-time, part-time, experimenters, those with no intent to transfer) leading to inconsistencies in the methodologies used when transfer rates are calculated, (4) need to follow students for long periods of time, (5) have difficulty in following students from one school to another, and (6) may lack the regular collection of transfer

data by government agencies or colleges themselves (ACE, 1991; Berman & Associates, 1990). Given the hardships of collecting transfer data, it is not surprising that only 31 (13%) of 234 colleges asked to participate in the recent 1990 Transfer Assembly project felt as though they could gather usable data (Brawer, 1991). Along a similar vein, a cooperative study begun in 1985 and coordinated by Johnson County Community College in Kansas attempted to follow the educational progress of 50 to 100 randomly selected first-time full-time students at 19 community colleges over a five-year period. Despite written confirmations from each of the participating colleges at the outset of the study, only 12 actually responded to the fall of 1987 follow-up survey (JCCC, 1987).

Despite the hardships of attempting to conduct studies in the area of transfer, it is estimated that approximately 25 percent of the students entering a community college eventually matriculate to a four-year college (ACE, 1991). A 1987 study by Brown using data from the U.S. Department of Education's High School and Beyond (HSB) Study indicated that 29 percent of the 1980 high-school graduates who entered community, technical, or junior colleges by October 1983 transferred to four-year institutions by 1985. Lee and Frank (1990) found similar results with the same database. This rate of transfer likely underestimates the actual rate in that some of these students were enrolled in terminal degree or certificate programs and did not intend to trans-

fer. Some students also take a longer time to complete community college studies prior to transfer than was allowed for in this study. The accuracy of this transfer rate - about one out of five - is strengthened by the conclusions of researchers using other data sets.

Berman and associates (1990) conducted a survey in the fall of 1988 of 32,150 students who had attended in the spring of the same year one of 28 two-year colleges referred to as the National Effective Transfer Consortium (NETC). The study used this definition of transfer: Only leavers who had earned six or more credits as of their spring enrolment who enroll at a four-year institution the following fall term. Among NETC colleges the average transfer rate was about 25 percent, with a range of variation from 12 percent to 40 percent. They found that the majority of students who had transferred did so by the end of their third year (55%). Based on their study, it is clear that measures of transfer limited to a three year period do not capture the full extent of the transfer phenomenon. Another finding of their study is that two-year colleges with a high percentage of full-time students tend to have higher rates of transfer than colleges with a low percentage of full-time students. Furthermore, among NETC colleges, the largest source of transfers comes from traditional students - often younger, recently graduated from high school, and from ethnic groups and family backgrounds with established patterns of academic

achievement (e.g. white, higher income households with college-educated parents).

The authors note that this uneven pattern of transfer is understandable in the two-year environment because many students attend part-time, some attend for several years before they transfer, and some attend to earn an associate degree without the intent to transfer. Berman and associates concluded that it is unreasonable to expect all students to transfer. The authors also caution that those who do research on transfer activity must be careful before they imply that the two-year college had any significant impact with respect to transfer on a student enrolled for only a short period of time prior to transfer. Berman argues that transfer calculations should be limited to those students who have a certain number of credits. There is little agreement, however, on how to define and/or practically measure student intent, capability, and academic behavior (Cohen and Brawer, 1985).

Cohen (1990) studied the transfer phenomenon at 114 two-year colleges participating in the Transfer Assembly Project, an ambitious project conducted by the Center for the Study of Community Colleges in Los Angeles and funded by the Ford Foundation. He found that just under 50 percent of the first-time students entering community colleges in the fall of 1985 with no prior college experience, had completed 12 or more credits at the community college within the ensuing

four years. Of that group, 24 percent had transferred to a neighboring four-year institution.

Some researchers have investigated another indicator of the magnitude of transfer by determining the percentage of baccalaureate degree recipients who attended a community college. Grubb (1991) determined that seven percent of the 1980 high-school graduates in the Department of Education's national database who received bachelor's degrees in 1984 started at a community college. State studies, where they exist, show higher percentages. The Washington State Board for Community College Education (1989), for example, determined that approximately 30 percent of baccalaureate recipients at the state's four-year institutions in the spring of 1988 had transferred credit from a community college. The WSBCCE found that 60 percent of the bachelor's degree recipients with community college credits had associate degrees.

Data from California show a similar pattern, revealing that two-year transfer students comprised about 20 percent of the University of California graduates and 49 percent of those graduating from the California State University (California State Postsecondary Education Commission, 1988). Another study by the National Center for Education Statistics analyzed the transcripts of the High School Class of 1972 and estimated that 20 percent of those receiving bachelor's degrees had attended a community college at some time (Adelman, 1987). Because community college transfers may transfer before completing the associate degree, the act of

transfer does not necessarily indicate that the student has achieved a specific standard of achievement that can be traced to the community college. It is clear that the contribution of the community college varies from student to student.

Astin's (1977) analysis of data from the Cooperative Institutional Research Program led him to conclude that - after controlling for socioeconomic status, educational aspiration, high-school background, and other variables - first-time college freshmen who begin their studies at community colleges are less likely to attain a baccalaureate than students who begin their studies at a four-year institution. He ascribes this phenomenon to the nontraditional structure of the community college, which caters to the part-time commuting student and has few characteristics that are highly correlated with persistence and baccalaureate-degree attainment such as opportunities for campus residence, full-time study, and extensive involvement in academic or extracurricular campus life. Cohen and Brawer (1989) take issue with Astin's implicit assumption that all students have a choice between attending a two-year and a four-year institution. They assert that in reality if it were not for the community college there might be no college at all for some students, thus the contribution of the two-year college may if anything be grossly underrated with respect to its contribution to baccalaureate attainment. Another obstacle that may impact transfer is the extra hassle that a

two-year college student encounters as they make the transition from one environment to another. For native students at a four-year college, moving from the lower to the upper division is simply a matter of registering for next semester's classes. Such is not the case for the two-year college student who must adapt to a new school which might be some distance away (Dougherty, 1992).

Research indicates that students transfer at almost any time after entry into a community college. Using the national NLS72 and High School Beyond databases, Grubb (1990) calculated that only 27 percent of the students in the 1980 cohort who transferred within four years of entering a community college did so after earning an associate degree. His study also indicated that those students with an associate degree outperformed those without the degree in terms of both persistence at the four-year college and baccalaureate attainment. Berman and others (1990) found that though most students transfer after having earned about 60 credits (39%), a large percentage transfer with fewer credits (61%) and many students transfer with considerably less than 60 credits.

State studies also provide insight into the timing of transfer. For example, the Illinois Community College Board (1986) conducted a five-year analysis to follow the progress of 9,757 community college students who transferred to public and private senior institutions in the state during the fall of 1989. The Illinois study found that 62 percent

of the students transferring to four-year colleges did so without completing an associate degree, and 56 percent of the transfers had fewer than 60 credits at the community college. In addition, the study found that students who transfer after completing the associate degree tend to have better academic records at the university than those who transfer after completing only a few credits at the community college. Another state study in 1988 by the Florida State Board of Community Colleges found that only 17.4 percent of community college students who enrolled in the Florida State University System in 1988 transferred fewer than 60 credits to the university.

There are few studies that have looked at the characteristics of community college students who transfer. Nevertheless it does appear that, on average, lower transfer rates are associated with Blacks and lower socioeconomic status, as well as, a variety of characteristics at the time of entrance into the community college: nontraditional age and part-time student status. The Illinois Community College Board (1990) conducted a study to determine the characteristics of those first-time community college freshman who are most likely to transfer and go on to earn a baccalaureate within an eight year period (1980 to 1988). The study found that the likelihood of earning a bachelor's degree within eight years of entering a state community college was enhanced if the student was white, male, 20 or younger at the time of entry into the community college, and initially

enrolled on a full-time basis. Grubb (1991) reported similar findings noting that minority students and those of lower socioeconomic status are less likely to transfer.

Statistical models that predict transfer have been developed by several researchers. Valez and Javalgi (1987) noted that students of higher socioeconomic status are more likely to transfer but that the statistical effect as a predictor of transfer is of a modest magnitude and that it is mitigated by high aspirations, and good college grades. Valez and Javalgi also determined that being black or Hispanic was positively correlated with transfer, when controlling for other variables.

Grubb (1990) found that transfer rates were highest among students who took an academic track in high school (rather than a vocational or general track). Valez and Javalgi found corroborating evidence, suggesting that the best predictors of transfer are aspiration, academic background, and academic involvement. Taken together, the two studies demonstrated that transfer students were more likely than nontransfers to have completed an academic track in high school, to have earned high grades in high school and college, to have taken science and mathematics courses, and to have devoted more time to their studies (as evidenced by the number of hours spent on homework while in high school and on the number of credit hours earned in college). In addition, Lee and Frank found that community college students who transferred had decided while still in high school

that they were willing to postpone entering the labor force in favor of study. In short, it appears that those students who are most academically inclined from high school on transfer at higher rates than those who are less academically inclined.

Several studies reviewed by Dougherty (1987) suggest that, on average, those students who begin at two-year colleges are less likely to persist and attain the baccalaureate than students who start at four-year institutions. Most studies, however, treat community colleges as homogeneous entities, whereas they are quite different from one another (ACE, 1991; Cohen and Brawer, 1989). These differences are evident with respect to transfer activity. For example, Berman and others (1990) point out that community colleges that focus primarily on vocational programs may have lower transfer rates than a more comprehensive community college that places heavier emphasis on transfer education. The effectiveness of the transfer function at a two-year institution can only be judged with reference to the environment in which it operates. Alba and Levin (1981) compared the academic achievements of students entering two-year and four-year colleges within the City University of New York (CUNY) and determined that community college students, despite the presence of controls, had lower persistence and graduation rates than native freshman at four-year colleges. However, there was variation among the colleges compared. In fact, students at two of the community colleges

in the study were as successful as students at some of the senior colleges. These observations suggest that institutional differences can account for some of the variation.

Although much interest has been applied to transfer, its root causes are not well understood. Current research suggests that some students, particularly those with poor academic backgrounds and those from low socioeconomic backgrounds, have lower transfer rates than academically talented students or those from wealthier families. In the absence of more data, the factors that promote or deter transfer remain open to speculation. Grubb (1990, 1991) surmises that the curricula in community colleges may not adequately prepare students for transfer and that the high enrollment of high risk students with relatively poor academic backgrounds may impede transfer. Several researchers assert that an overemphasis on vocationalism may be a factor that deters students from pursuing a transfer program (Brint and Karabel, 1989; Lee and Frank, 1990).

Dougherty (1987, 1992) conjectures that a number of factors discourage transfer activity to include low selectivity which increases the likelihood that weaker and disinterested students will discourage their peers from trying hard in college. Moreover, Dougherty hypothesizes that the lack of residence halls and the tendency of community college students to be less involved on campus than students at four-year institutions contribute to less academic achievement as does the tendency of faculty at community colleges

to limit their student expectations. Other barriers to transfer include strained relations between two- and four-year colleges (Rollyson, 1986; Thomas, 1988), a lack of faculty involvement in transfer activities (Berger and Ortiz, 1988), a lack of course compatibility and articulation agreements (Bogart and Murphey, 1985), inadequate student services supporting transfer (Atkinson, 1987), and the lack of retention strategies (Astin, 1975; Turnbull, 1986; Voorhees, 1987.

Brint and Karabel (1989) are among a group of researchers who are highly critical of the ability of community colleges to carry out the transfer process. They argue that the low transfer rates observed among community college students and increasing enrollments over the past two decades in their terminal career and vocational programs represent a "conspiracy" perpetrated by business leaders and community college administrators to lead students away from a liberal arts education. Compelling and consistent data presented in their recent book "The Diverted Dream" indicate that baccalaureate aspirants are less likely to receive a bachelor's degree if they initially enter a community college rather than a four-year college. The authors contend that community colleges tend to dampen or "cool out" the academic aspirations of their students and steer them into occupational programs prematurely, rather than strongly encouraging them to grapple with and achieve success with the transfer curriculum. The distressing result is that too

many students, especially poor and minority students, are routed into lower-level technical jobs requiring specific industrial and commercial competencies. Brint and Karabel suggest darkly that the overall impact of the two-year institution has been to accentuate, rather than reduce prevailing patterns of social and class differences.

A recent review by Dougherty (1992) also details a substantial body of literature that documents the "baccalaureate gap" that is only partially explained by the different characteristics of the two student bodies. He concludes that community colleges need to "look beyond remedying the deficiencies of community college students to reforming the institution itself in fundamental ways" (p. 204). He suggests that transfer rates would be increased by better transfer advising, greater efforts to integrate students into the academic and social life of the campus, more rigorous pretransfer academic preparation, more financial aid for transfer students, converting community colleges into branch campuses of state universities, and greater acceptance of community college credits by the four-year institution.

The position that community colleges are becoming overly vocationalized is countered by Polonio and Williams (1990) who contend that the business-college connection is an outgrowth of an American economy in need of more skilled and literate workers. The change in the community colleges documented by Brint and Karabel is primarily a response to the need for workers with skills that are valued in the

marketplace and for which firms have not developed on- the-job training programs. On the student level, the shift in interest to vocational options has been driven by student interest, as well as, capitalistic needs. In the same regard, many four-year colleges have also shifted away from a liberal education toward more career and professional training. Adelman (1992) stresses that the intensity of one's aspirations for the baccalaureate degree varies widely from casual to committed and does not always reflect realistic plans. He further emphasizes that the bachelor's degree is a "culturally visible symbol with significant power in public policy," in contrast to the less respected associate degree (p. 26). Adelman suggests that students who enter the community college with impractical expectations to earn a baccalaureate degree within four years are encouraged to get on an educational track that best fits their academic strengths and culminates in a terminal degree valued by community college educators.

Vocationalization of the community college and the "chilling out" of entering students is not as much an issue at Gainesville College as it might be at other two-year colleges, since the majority of its students are enrolled in transfer programs and that percentage has increased through the 1980's. In the fall of 1983, 20.3 percent of Gainesville College's students were enrolled in a terminal degree career program. By the fall of 1990 that percentage had declined steadily without interruption to 9.9 percent. The number of

June graduates in career areas over the same time period has mirrored the same phenomenon: 26.5 percent of June 1983 graduates were in career programs, while only 10.0 percent were in the same by June 1990 (Gainesville College Registrar's Annual Reports on June Graduates and Guidance Office Quarterly Reports on Student Majors, 1983 to 1990). In addition, 91 percent (369) of the 403 first-time, full-time students in the transfer component of the current study had self-declared transfer majors. Relatively few students are enrolled in the limited number of terminal degree programs offered by Gainesville College. Moreover, vocational/technical programs in the state of Georgia are for the most part in a separate system of technical institutes. Given the focus on transfer programs, it is not surprising that almost all of the suggestions fowarded by Dougherty (1987, 1992) for enhancement of transfer success exist at the Gainesville College.

The research substantiates what many have long suspected: a minority of all community college students transfer; that some students are more likely to transfer than others; and that students transfer at any point in time after enrolling at the community college (Palmer, 1991). This data should be approached with caution in that there is great variety among two year institutions. It appears, however, that the two-year transfer rate is approximately 25 percent. Moreover, a reading of the literature makes it obvious that a clear, consistent outcome measurement is needed in order

to discuss transfer, and subsequently to improve the transfer function of the community colleges.

Transfer as an issue is further complicated by the finding that even after transferring to four-year colleges, community college students are still at greater risk of dropping out before they attain a bachelor's degree than four-year college natives (California Community College, 1984; Florida State Education Department, 1983). The difference has been ascribed to the overall weaker academic ability of the community college transfers (Dougherty, 1992), the finding that transfer students receive less financial aid (Holmstrom and Bisconti, 1974), lose credits as a result of transfer (Maryland State Board for Community Colleges, 1983), are less academically prepared as evidenced by a drop in grades in the first year after transfer (California Community Colleges, 1984; Cohen and Brawer, 1989; Kintzer and Wattenbarger, 1985), and transfer shock (Johnson, 1987).

Suffice it to say that the two-year college is an academically and socially complex and controversial environment with regard to transfer. The current study proposes to investigate whether the three-year transfer rates of CPC-completers differs from that of CPC-noncompleters. Students who have completed a high-school curriculum designed to prepare them for college study might be expected to have an advantage over those who did not, an advantage that might manifest itself in higher transfer rates. The research reviewed suggests that transfer activity is likely to be low

overall, that it is important to identify those students enrolled in transfer degree programs, and that an effort should be made to determine the extent to which students transfer to private institutions and out-of-state.

## The CPC Mandate in Georgia

As set forth by the Board of Regents (1984) and effective with students who graduated from high school in the spring of 1988, or later, the College Preparatory Curriculum represents the minimum coursework needed for regular admission to any University System of Georgia program, including associate degree transfer programs, that lead to a baccalaureate degree. The new requirements were mandated in an effort to strengthen the academic quality of secondary education, thus provide a better prepared student for college admission.

The University System of Georgia based its CPC requirements for its 34 institutions on academic competencies in English, mathematics, social studies, science, and foreign language. In 1984 the Chancellor's staff and the Georgia Board of Education gave notice to the then 9th graders - as well as their parents, faculty, and counselors - that they would be expected to meet these requirements by their senior year in high school. In 1987, 1988 and 1989, the Regents' Office of Academic and Student Affairs issued guidelines to be used in conjunction with the *Preparing for College* (Board of Regents, 1984) document that refined earlier interpreta-

tions of courses that applicants could use to fulfill CPC needs and clarified various issues.

Interestingly, the Board contended rather boldly, that "success in selected high-school courses contributes immeasurably to a student's success in college" (Board of Regents, 1984, p. 1). Despite the lack of empirical proof, this is the underlying assumption not just of Regents' policy but of the entire curriculum reform movement. In short, the assumption is that students who complete a college preparatory set of courses in high school are more likely to succeed in college. In addition, the Regent's policy was vague as to the expected outcome(s) in terms of college success to be expected by implementation of the CPC admissions guidelines.

The Regent's CPC program is essentially identical to that specified by the Georgia State Department of Education (1984) which was also introduced in 1984. Students who complete the set of CPC requirements laid out by the State Board receive a seal of endorsement on their diploma. The only significant difference between the two relates to the acceptance of certain high-school level courses which some students take in the eighth grade: algebra I, physical science, and foreign language. The University System will accept these courses as fulfilling its CPC while local school districts do not necessarily allow this pre-high-school work to count toward the State Department of Education's endorsed CPC.

The CPC coursework requirements are listed in the table below. Simplified, the 15-course CPC policy which is divided among the traditional five core academic areas, states that entering freshmen must have four years of English, three years of math, science, and social science, and two years of foreign language (Board of Regents, 1984). It is worth noting that University System of Georgia policy mandates that the courses used for CPC remediation do not count toward graduation requirements. The courses count in all other ways (grade-point average, honors, etc.).

| COURSE (Units) | INSTRUCTIONAL EMPHASIS |
|---|---|
| English (4) | Four years with instructional emphasis on grammar and usage, American and world literature, and advance composition skills. |
| Mathematics (3) | Three years with two courses in algebra and one in geometry. |
| Science (3) | Three years with one year on physical science and at least two laboratory courses from biology, chemistry, physics, or related areas of science. |
| Social Sciences (3) | Three years to include American History world history, and a course in economics and government. |
| Foreign Language (2) | Two years in one language emphasizing speaking, listening, reading, and writing. |

The University System of Georgia's CPC policy applies to all students described in the categories below:

1. Students graduating from Georgia or out-of-state public or private high schools in spring 1988 or later. These requirements do not apply to students who graduated prior to spring 1988, regardless of when they enroll in a University System of Georgia institution.
2. Students who passed the GED in lieu of high-school graduation if their class graduated in spring 1988 or later. (The GED, in itself, does not indicate fulfillment of CPC requirements).
3. Students whose high-school class would graduate in spring of 1988 or later who are admitted through an Early Admission Program.

4. Transfer students who have not completed at least forty-five hours of accepted transfer Core Curriculum credits with a minimum of 2.0 average.
5. Students who transfer from University system programs which do not require the CPC into programs leading to a baccalaureate degree unless they have forty-five hours of accepted transfer Core Curriculum credits with a minimum of 2.0 average.

**Provisional Admissions Policy:** The Board of Regents anticipated correctly that a period of adjustment would be needed for students exiting high school with CPC requirements who had an interest in attending college. It would be harsh judgment at best and politically difficult to execute a policy that denied access to public higher education in Georgia based solely on high school underpreparedness. For this reason, the Board created a category of "provisional" admission for CPC-noncompleter freshmen entering the System.

The provisional admissions policies help students with CPC requirements make the transition to college. Students with unsatisfied CPC areas may enter a System institution with the condition that within a year's time they make up their lack of CPC credits. Students with CPC requirements in English or mathematics will be required to take the respective area(s) College Placement Examination (CPE). They will be required to meet all institutional and University System guidelines related to placement and exiting of Developmental Studies. Students lacking in social science, science, and foreign language pre-college credits will be required to take at least one "make-up" course based on the provisional student's CPC history.

The Board of Regents continues to recognize the authority of each institution to establish higher standards than those listed and there is some variance among policies and "make-up" courses from one institution to another. The methods of satisfying CPC requirements at Gainesville College, a two-year unit of the University System, are outlined in the table below. Students not completing the prescribed remediation by their 45th hour of college credit will be able to register for remediation only.

| AREA | PRESCRIBED REMEDIATION AT GAINESVILLE COLLEGE |
|---|---|
| English | Screened for Developmental Studies by the College Placement Examination in English. |
| Mathematics | Screened for Developmental Studies by the CPE in Math. |
| Social Science | Complete History 111 or Economics 100 with a 'C' or better. |
| Science | Complete Environmental Science 101 with a 'C' or better. |
| Foreign Language | Complete two elementary French or Spanish courses with a 'C' or better. |

### CPC and the University System of Georgia

In June 1991, the Board of Regents released a study that documented the depth and scope of Georgia's college preparatory program and its effects on academic success in the University System for those students who graduated from high school in 1988 to 1990 (Hudson and Pounds, 1991). The Regents' Office reports State Department of Education data showing that about 40 percent of the students graduating from public high schools in Georgia in 1988, 1989, or 1990, did so with the CPC diploma. Those without the CPC-creden-

tial graduated primarily with general or vocational diplomas (the only other type of degree is in special education which accounts for very few students). The report emphasizes that there are no data to indicate whether CPC-noncompleters intended to matriculate to college and attempted to complete the CPC courses, but did not, or whether they made a late decision to go to college.

Throughout the University System of Georgia, about 70 percent of the entering students had completed the CPC for the fall quarters of 1988, 1989, and 1990. The subject areas that were most likely to be unsatisfied, hence of greatest concern, were mathematics, foreign language, and science. In 1990, the percentage of students who had not completed each of the five CPC areas were as follows: English (4%), mathematics (19%), foreign language (18%), science (17%), and social sciences (8%). The percentages in foreign language, science, and social science were higher in 1990 than in 1988, while the others were slightly lower.

The percentage of those who enter the University System with unsatisfied CPC areas varies by gender and ethnicity. In general, the gender differences are slight. For example, in the fall of 1990, 67 percent of entering Georgia-resident males had completed the CPC as compared to 73 percent of the females. The situation differs, however, by ethnicity. In the fall quarters of 1988, 1989, and 1990, Blacks were about twice as likely to enter the System with one or more unsat-

isfied CPC areas as compared to all others. The problem is most acute for Black males.

Not surprisingly, the number and percentage of students who have unsatisfied CPC areas varies by type of institution. Almost all of the students entering state universities in 1990 had completed all areas of the CPC (95%), as compared to 80 percent at the regional university, 66 percent at four-year colleges, and 51 percent at the two-year colleges. The disparity by type of institution can be striking. In the fall of 1990, the percentage of students at two-year colleges who had not satisfied the CPC-mathematics requirement (34%) was seventeen times greater than the percentage of similar students at universities (2%) and the difference was greater in 1990 than in 1988. Overall, the effects of not completing the CPC in high school are minimal at the University of Georgia (i.e. fewer than 1% are noncompleters) and nonexistent at Georgia Technical Institute.

The Regents' report used three indicators of academic preparation to compare CPC-completers and CPC-noncompleters: high-school grade-point average, SAT scores, and placement in Developmental Studies. In all instances, there were dramatic differences between the two cohorts for each of the three entering groups of students. For example, in 1990, the mean high-school grade-point average for those who completed the CPC was 2.9 and the mean high-school grade-point average for those who did not complete the CPC was 2.1. The strong and positive relationship between CPC completion and high-

school achievement as measured by grade-point average also held true for SAT scores. Mean verbal, mathematics, and total SAT scores for those who completed the CPC were significantly higher than CPC-noncompleters. In 1990, the mean SAT-verbal score of CPC-completers was 82 points higher than CPC-noncompleters and the SAT-math difference was 114 points higher for CPC-completers as compared to CPC-noncompleters.

The study noted a relationship between CPC completion status and Developmental Studies placement.[1] Of those who completed the CPC in high school and entered a System unit in the fall of 1990, over one out of five (22.2%) placed into Developmental Studies. This is a troubling statistic, especially in light of the fact that in 1988 the percentage of CPC-completers who placed into Developmental Studies was 18.9 percent. This trend contrasts with the expectation that completing the CPC would improve academic preparation over the years, yet it pales in comparison to the Developmental Studies needs of those who have not completed the CPC in high school. The Regents' Report showed that 80 percent of those students who entered the System in 1990 with one or more unsatisfied CPC areas were placed into Developmental

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[1]It should be mentioned that regardless of CPC status, students are required to take the College Placement Examination if their SAT scores in mathematics and/or English fall below a prescribed minimum. Ultimately, it is their CPC score that determines whether they place into a Developmental Studies course. Thus, completion of the CPC alone does not guarantee regular placement.

Studies English, reading, and/or mathematics, compared to 73 percent in 1988 and 78 percent in 1989.

When one considers the academic progression of first-time freshmen who were full-time students in their first quarter of attendance, it is evident that CPC-completers outperform CPC-noncompleters. For example, the one-year retention rate for CPC-completers who entered the University System in the fall of 1988 was considerably higher at 76 percent than the retention rate of 55 percent for those who did not complete the CPC. The retention rate difference increases after two-years with 58 percent of CPC-completers returning compared to 35 percent of noncompleters. Attrition for CPC-noncompleters who entered with Developmental Studies needs was the greatest; six out of ten of those students are not in the System after two years. The study found that the attrition rate was directly proportional to the number of unsatisfied CPC areas. Moreover, the report found that students with unsatisfied CPC areas were less likely to transfer within the System than those who completed the CPC. It is likely, however, that retention and transfer rates were underestimated, since no effort was made to determine whether students were drop-outs or "stop-outs" or transferred to an institution outside the University System.

Another finding of the systemwide study was the great difficulty CPC-noncompleters experienced in trying to remove the burden of unsatisfied areas that they brought with them to college. After one year of potential study, many of the

CPC-noncompleters who were still enrolled continued to require college makeup work, especially in foreign language, mathematics, and science. The report concluded that the need to take additional coursework in college to satisfy CPC admission requirements appeared to slow their progress toward degree attainment.

Furthermore, Hudson and Pounds investigated whether the academic performance of CPC-noncompleters were similar to that of CPC-completers by tracking hours enrolled and hours earned. Hours enrolled, as defined in the study, were the hours for all courses to include institutional credit courses (i.e. those for which no credit toward a degree is awarded). Hours earned included only course credits that counted towards a degree. The study found that although the mean number of hours enrolled was similar for both entering groups of full-time students from one quarter to the next, the mean number of hours earned for CPC-noncompleters was significantly less than that of the CPC-completers. After two full academic years of study, the differences in hours earned between the two groups underscores the coursework obstacle that students with unsatisfied CPC areas must overcome. By the spring of 1990, CPC-noncompleters who began as full-time students in the fall of 1988 and who were still enrolled (one-half were not), had earned on average 51 credits as compared to the 74 earned credits of CPC-completers. The difference of 25 earned credit hours represents two quarters of full-time study.

Finally, the study found that the mean cumulative grade-point averages of those who completed the CPC in high school and those who did not were different. Students who enter the System without completing the CPC in high school have mean cumulative grade-point averages of 1.80 and 2.02 after one and two years of study, respectively as compared to 2.42 and 2.56 for CPC-completers over the same time period. It appears that even after a second year of study, those with unsatisfied CPC areas do not perform in college at the same academic level as CPC-completers.

In summation, the descriptive approach used in the Regents' study that divides entering freshmen into two cohorts - CPC-completers and CPC-noncompleters - reveals striking differences between the groups with respect to precollege and college indicators of achievement and progression. In all cases, those students who satisfied all of the CPC areas in high school outperform those who did not. When compared to CPC-completers, those who do not complete the CPC are less prepared for college-level work as evidenced by lower SAT scores and lower high-school grade-point averages and, on average, have higher attrition rates, greater developmental studies needs, lower cumulative grade-point averages in college, fewer earned hours after one or two years of study, and lower transfer rates. These differences cannot be taken lightly as the System moves into the 1990s, especially for those in the two-year institutions, since they receive the greatest influx of CPC-noncompleters.

## The Impact of Georgia's CPC at a Public Research University

Aside from the Regents' studies, there appears to be only one thorough effort to examine the impact of Georgia's CPC. John Albright (1990) looked at the impact of Georgia's CPC at the University of Georgia on a number of different measures of freshmen success to include freshmen cumulative grade-point average, high-school grade-point average, SAT verbal and math scores, and persistence into the sophomore year. The thrust of the study was to determine whether students who took a secondary curriculum that fully satisfied the CPC would have more success in college as compared to those that did not, while controlling for the effects of a number of pre-college variables such as high-school averages, SAT scores, parental education, and intended college major. These and other pre-college variables were used in the development of regression models predicting two common indicators of college freshman year success: cumulative grade averages and enrollment persistence into the sophomore year. It should be noted that the Regents' CPC mandate did not apply to the students in this study since they graduated from high school prior to June of 1988. Thus even those on an academic track in high school who intended to matriculate into college were under no "penalty pressure" to complete the CPC.

The author investigated a random sample of 426 students who graduated from American high schools and who were traditional full-time freshmen at the university in the fall of

1986. Most of the students were from Georgia and the majority had SAT scores and high-school averages well above state and national means. The study detected only slight positive effects of CPC completion on college grade averages and no statistically significant contributions on persistence.

Despite the evidence that the CPC was somewhat beneficial, Albright cautions that relying on CPC alone as a predictor of college success would be unwise. His study emphasized that satisfying this 15 course requirement produced only a small explanation of the variance in freshman grade averages beyond other pre-college characteristics such as high-school achievement, academic aptitude, and sociodemographic characteristics.

An important observation was the possibility that colleges could make use of CPC requirements as flags, as is currently being done throughout the System, for freshman placement in remedial English and mathematics courses and special advisement. In addition, CPC requirements guide students who have not had adequate pre-college preparation into institutional credit courses that help to develop a variety of skills that improve college success such as note-taking, study habits, reading comprehension, and test-taking.

There is no certainty that the external validity of Albright's study would carry over to a similar study using actual CPC-noncompleter students at any of the two-year units of the University System of Georgia. As a whole, the

student bodies at the two different institutions have decidedly different profiles. The students in the University of Georgia study were not typical of those who enter into a two-year System unit such as Gainesville College based on any number of characteristics to include high-school averages, SAT scores, need for remediation, career/degree intentions, part-time/full-time status, and average age of undergraduates (see Board of Regents Information Digest, 1989-1990; University of Georgia Fact Book, 1990; Gainesville College Fact Book, 1990-1991).

It is of interest to note and to stress that for the most part those students who enter the University, especially as full-time students, are a cohort of academically strong students compared to the broader cross-section of higher risk students enrolling at a two-year college. The University is not as much of an initial testing ground of their aptitude and potential as is often the case at a two-year college. Students starting at the university should be expected to succeed at a higher rate as evidenced by the fact that they passed the admissions criteria which presumably screens students by SAT score and high-school average.

## Conclusion

Over the past two decades, states have implemented new college standards for regular admission that prescribe high-school curricula believed to best prepare students for college-level work. The underlying rationale for the concern

over college admission standards can be traced primarily to the large number of underprepared students who enter college in need of developmental studies and the economic interest of states to provide higher education opportunities to as many citizens as possible. Elevating standards at the gateway into college was seen as the necessary "hammer" that would encourage more high-school students to take the college preparatory track as they enter high school. Planners hoped that this choice - to complete a challenging set of pre-college courses in high school - would lead to greater academic success rates in college as measured ultimately in terms of persistence to graduation.

Educators (and politicians alike) insist that high-school curricular choices influence college success. Perhaps the most persuasive evidence for this comes through research demonstrating the positive relationship between high-school coursework and high-school grade averages and scholastic aptitude test scores. Both of these precollege indicators are stable predictors of a variety of college success measures such as freshman grade-point average, the number of earned credits, and persistence. It appears, however, that merely taking a particular set of academic courses in high school is not as important as the way in which the content and objectives of the coursework translate into gains in these two indicators of college success. It is not surprising then, that completion of a college preparatory curriculum in high school alone does not guarantee that a student

will arrive at college prepared to take "regular" college-level courses. The University System of Georgia data indicates that although those who complete a college preparatory curriculum in high school are less likely to place into developmental studies, they still do so in relatively large numbers. This is not necessarily in the students best long-range interest. Developmental studies placement has been shown to positively influence certain college outcomes in the short term for some students, but its long-term effect appears to impede progress towards degree attainment.

One of the more important measures of success in the two-year environment that is becoming much more visible in the literature is transfer activity to baccalaureate-granting institutions. Although detailed studies of the complex transfer phenomenon are difficult to undertake, it appears that the transfer rate is fairly low (around 25%) and may vary considerably from one two-year institution to another. Many factors influence the likelihood that students will eventually transfer to include whether they study full-time, age at entry, high school preparation, remedial needs, degree to which vocational programs are emphasized, and educational plans. Transfer is further complicated by the finding that even after transferring to a four-year college, two-year college students are still at greater risk of dropping out before they attain a bachelor's degree.

The literature makes it clear that a discussion of outcomes as they pertain to the two-year institution must

take into account a number of considerations that are not generally associated with senior colleges and universities. These include a student body that is on average more likely to commute, less likely to be academically strong, less likely to have realistic and certain plans for the future, less likely to engage in extracurricular activities, and more likely to work part-time while they attend school. For the most part, community college students are less integrated, both academically and socially, into the life of their institution.

Educational improvement involves changing behavior to include getting students to take challenging courses that directly relate to college success, to study harder and to learn more. It is a formidable task. There is no doubt that the quest of states such as Georgia to increase success rates in college will continue to be plagued with frustrating results. This is particularly evident in light of the stubborn trends that show little improvement in the course-taking habits of high-school students throughout the 1980's and in the degree to which they are prepared to engage the rigors of college-level study. Measuring the impact of a preparatory curriculum on college success and reporting the findings throughout the higher education community and back to the high schools is a worthwhile pursuit to rationally guide the continued implementation of curricular policy.

## III. Research Design

This two-part longitudinal study of first-time, full-time students who enrolled at a public, two-year college during the fall of 1988, 1989, or 1990 examined the relationship between their secondary curriculum and subsequent academic success in college. The population of students utilized in the study represented different CPC completion profiles, a moderately wide range of SAT scores and high-school grade averages, and a variety of developmental studies needs. These academic variables together with gender and race were used to address the central question as to whether those students who completed the state-mandated college preparatory curriculum will be more successful in their first year of college and show higher rates of transfer to baccalaureate-granting institutions as compared to students who did not complete the CPC while controlling for selected background variables.

### Theoretical Model

The causal model framework for the study theoretically proposes that those students who have completed the CPC in high school are advantaged with respect to measurable educational outcomes over those that did not and that this advan-

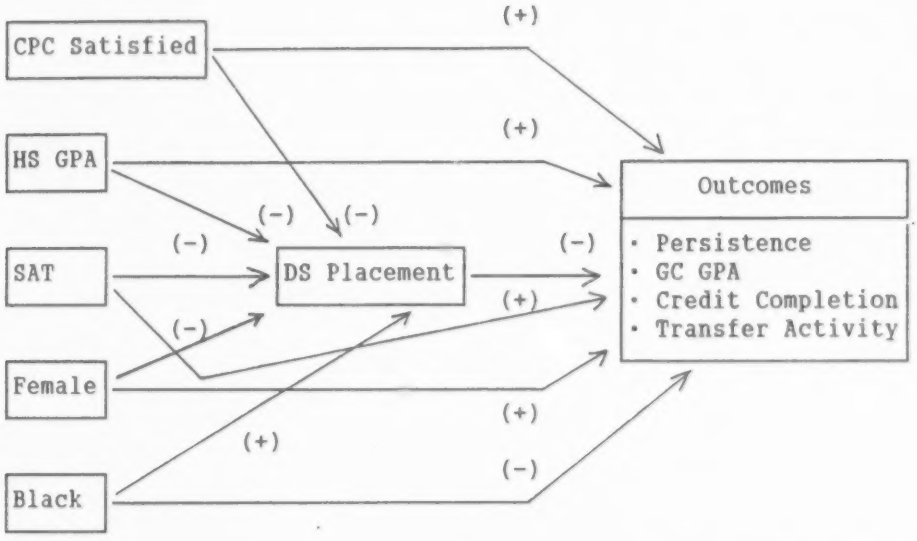


Figure 1. Theoretical causal model for CPC effects on college outcomes in the context of other independent variables. The six components proceed from left to right and are hypothesized to affect, directly or indirectly, all components following them in causal order.

tage would hold true even after the influence of selected precollege variables is held constant. The independent or exogenous variables (CPC completion, high-school grade average, SAT scores, gender, and race) of completers and non-completers were correlated with the achievement of specific academic outcomes: persistence across a three quarter period within their first year, cumulative freshman grade-point average, completion of college credit, and transfer to a baccalaureate-granting institution (Fall 1988 transfer majors only). The model assumes that the dependent variables are preceded chronologically and causally by the background variables.

Evidence from a number of sources indicates that high-school grade average has a positive influence on educational outcomes and is a practical measure for predicting college success (Astin, 1971, Fishman & Pasanella, 1960; Wilson, 1983). Goldman and Sexton (1974) demonstrated that the total high-school grade-point average and academic high-school grade-point average correlated about the same with freshman grade-point average. They concluded that there is little reason to remove nonacademic courses (e.g. mechanical arts, fine arts, business/clerical, home economics) from determinations of high-school average by college admissions officers. Regardless, the high-school average computed by the Office of Admissions at Gainesville College and incorporated into the student database is based exclusively on those academic courses that fall within each of the five CPC areas: English, foreign language, mathematics, science, and social science. Likewise, nationally normed aptitude measures like the SAT and ACT Assessment have been shown to statistically strengthen the predictive value of multiple correlation models (Weitzmen, 1982). In predictive validity studies, the two SAT scores can be summed so that the sum can be treated as a single predictor, since the combined SAT score is a better predictor than either SAT-math or SAT-verbal alone (Donlon, 1984). A June 1991 report by the Board of Regents indicates that Blacks and males are more likely to have unsatisfied CPC areas as compared to all

others and females, hence these two variables were included in the model.

Although evidence suggests that college-track curricular choices in high school do not guarantee success in college, the model postulates that academic success at a two-year college will be directly related to CPC completion in high school after controlling for the background variables. A recent study by Albright (1990) indicated a weak, but statistically significant relationship between the completion of all CPC areas and freshman year grades at a major public university. This relationship, however, did not hold up with respect to one-year persistence.

The intervening variable of developmental studies placement was explored as an indirect path from the background variables to the achievement of the outcomes. It is postulated that developmental studies placement will negatively affect the outcomes even when the other variables are held constant. Furthermore, it is hypothesized that the precollege factors used in the model will decrease the likelihood of developmental studies placement, thus further enhance their total positive influence on the outcomes measured. It should be noted that developmental studies placement is hypothesized to have a direct effect on the outcomes. The hypothesized nature of the general causal connections is portrayed in Figure 1.

A note of caution should be mentioned when interpreting the data from a causal model. A causal model is an estimate

based on correlational data, hence one cannot confer strict causality from the multivariate regression results. Causal relationships exist in models because theories posit them. Causal modeling does not prove the validity of the causal structure, rather it attempts to determine the hypothesized plausability of the *a priori* causal structure by fitting it to existing longitudinal data (Maruyama & Walberg, 1982). The direct and indirect effects determined by structural equations constructed by the model imply only the possibility, not the actuality, of causal relationships (see Wolfle (1985) for a good discussion of causal modeling in higher education).

## Method

As suggested by the proposed causal model, the analysis focused on the impact of CPC on several educational outcomes: freshman grade-point average, quarter credit hours earned, one-year persistence, and three-transfer activity. Path analysis was employed to assess the direct and indirect effects.

## Population

The 1205 students in the study were first-time, full-time freshmen who enrolled at Gainesville College during the fall quarters of either 1988 (n=406), 1989 (n=434), or 1990 (n=365). They represented 54% of the total first-time freshmen enrollment (n=2232) for the aforementioned fall

quarters. In order to maximize similarities among their high school curricular experiences, students in the study were Georgia residents who graduated from high school in the June prior to their quarter of entry. All students in the study were required to meet the 1988 College Preparatory Curriculum (CPC) requirements as mandated by the State of Georgia for unconditional admission to University System units. In addition, only those students who enrolled for a full-time load (12 or more credit hours) during their first fall quarter were included in the study in an attempt to define a cohort that was most likely to make academic progress over their first academic year as compared to those who began as part-time students.

The study was divided into two parts: The first involved the entire cohort of 1205 students who were followed for their first academic year (fall, winter, and spring quarter) for determination of their grade-point average at Gainesville College and the number of credit hours they earned. In addition, persistence patterns were established by determining whether the 1205 students enrolled at Gainesville College after their fall quarter of entry in the subsequent winter, spring, and/or fall quarters. A profile of the 1205 students is shown in Table 1. Females made up 55.4% (n=668) of the total, while Blacks consisted of only 3.0 percent (n=37). Slightly more than 40 percent (n=486) of the cohort entered Gainesville College without completing one or more CPC areas. The study revealed striking differences between

those who satisfied all CPC areas (CPC-S) and those who did not (CPC-NS). Blacks (64.9%) were far more likely than other students (39.6%) to have entered Gainesville College without having satisfied all CPC areas. Likewise, males (43.6%) were more likely than females (37.7) to have one or more unsatisfied CPC areas.

Table 1. Students in One-Year Study by Sex, Race, and CPC Classification (N=1205)

| | | CPC-S | | CPC-NS | |
|---|---|---|---|---|---|
| | N/Avg | n/avg | %N | n/avg | %N |
| Total | 1205 | 719 | 59.7 | 486 | 40.3 |
| Gender | | | | | |
| Female | 668 | 416 | 62.3 | 252 | 37.7 |
| Male | 537 | 303 | 56.4 | 234 | 43.6 |
| Race | | | | | |
| Black | 37 | 13 | 35.1 | 24 | 64.9 |
| All Other | 1168 | 706 | 60.4 | 462 | 39.6 |

CPC-S: All CPC areas satisfied
CPC-NS: One or more CPC areas not satisfied

The second component involved a three-year transfer study conducted on a subset (n=369) of the 406 first-time full-time students who enrolled during the fall of 1988. The 369 students in the transfer study were selected out of the 406 on the criterion that they had a self-declared transfer major recorded in the student database as reported to guidance counselors at Gainesville College. Their profile was similar to that of the students in the one-year study (see Table 2). These students were followed for a three-year

period from the fall of 1988 to the fall of 1991 from Gainesville College to baccalaureate-granting public and private institutions both in and out of the state of Georgia. Those not included (n=37) in the study had self-declared majors that led to a terminal two-year associate of applied science degree. They were therefore omitted from the study to attenuate the variance associated with the transfer function.

Table 2. Transfer Study Students by Sex, Race, and CPC Classification (N=369)

| | | CPC-S | | CPC-NS | |
|---|---|---|---|---|---|
| | N/Avg | n/avg | %N | n/avg | %N |
| Total | 369 | 199 | 53.9 | 170 | 46.1 |
| Gender | | | | | |
| Female | 199 | 113 | 56.8 | 86 | 43.2 |
| Male | 170 | 86 | 50.6 | 84 | 49.4 |
| Race | | | | | |
| Black | 10 | 4 | 40.0 | 6 | 60.0 |
| All Other | 359 | 195 | 54.3 | 164 | 45.7 |

CPC-S: All CPC areas satisfied
CPC-NS: One or more CPC areas not satisfied

Tables 3 and 4 present the areas in which students had not satisfied the college preparatory curriculum in high school and a breakdown showing the relative numbers of unsatisfied CPC areas for students in the one-year and transfer studies. A large percentage of the students in the one-year study who had not completed all of the CPC-seal course requirements were lacking mathematics (74.7%), fol-

lowed by foreign language (57.0%), science (53.5%), social sciences (15.6%), and English (0.8%). Similar percentages occurred with the 369 transfer study students. It is interesting to note that almost 60 percent of the students in either part of the study had two or more unsatisfied CPC areas. The data indicate that many students entering Gainesville College do so without completing the prescribed college-transfer curriculum and enter college with multiple unsatisfied areas with an emphasis on mathematics, foreign language, and science.

Table 3. Unsatisfied CPC Areas for Students in One-Year (N=1205) and Transfer Studies (N=369)

| | N=1205 | | N=369 | |
|---|---|---|---|---|
| CPC Area | N | %age | N | %age |
| CPC-S | 719 | | 199 | |
| CPC-NS | 486 | 100.0 | 170 | 100.0 |
| English | 4 | 0.8 | 3 | 1.8 |
| Frgn Lang | 277 | 57.0 | 92 | 54.1 |
| Mathematics | 363 | 74.7 | 125 | 73.5 |
| Science | 260 | 53.5 | 90 | 52.9 |
| Social Sciences | 76 | 15.6 | 27 | 15.9 |

CPC-S: Satisfied all CPC requirements in high school
CPC-NS: Not satisfied one or more CPC areas

Table 4. Multiple Unsatisfied CPC Areas for Students in One-Year (N=1205) and Transfer Studies (N=369)

| Number | N=1205 N | %age | N=369 N | %age |
|---|---|---|---|---|
| Tot CPC-S | 719 | | 199 | |
| Tot CPC-NS | 486 | 100.0 | 170 | 100.0 |
| 1 | 198 | 40.7 | 70 | 41.2 |
| 2 | 126 | 25.9 | 49 | 28.8 |
| 3 | 118 | 24.3 | 35 | 20.6 |
| 4 | 44 | 9.1 | 16 | 9.4 |
| 5 | 0 | 0.0 | 0 | 0.0 |

CPC-S: Satisfied all CPC requirements in high school
CPC-NS: Not satisfied one or more CPC areas

## Variables and Their Indicators

Tables 5 through 8 summarize the background variables and those concerned with developmental studies, college preparatory curriculum, academic success, and transfer to a baccalaureate-granting institution.

**Background Variables.** Several academic and demographic control variables were used in the multivariate regression analysis that the literature suggests correlate with measures of academic success. These background variables were included in order to isolate the effect of the college preparatory curriculum on success in the freshmen year and transfer activity success. In the interest of statistical parsimony, the SAT verbal and math scores were combined into a total SAT score with a scale of 400 to 1600. Combining the SAT scores does not affect the overall predictive value of the model, but it conserves the number of variables used, thus decreasing the standard errors of all estimates (Noru-

sis, 1982). Other variables include high-school grade average (0.0-4.0), gender (0-male, 1-female), and race (0-all other, 1-black). The control variables are listed in Table 5 along with their coded scales, means, and standard deviations.

**Developmental Studies.** Developmental studies was used as an intervening variable to determine whether it is a hindrance to student achievement that exacerbates the effects of CPC completion and the control variables. Students can place into one or more developmental studies areas: reading, English, and mathematics. This variable is coded from 0 to 3 depending on the number of developmental studies areas into which the student placed. (see Table 5).

Table 5. Control and Intervening Variables and Their Coding Scales, Means, and Standard Deviations for the One-Year and Transfer Study Students

| Variable | Coding Scale | One-Year N=1205 Mean | SD | Transfer N=369 Mean | SD |
|---|---|---|---|---|---|
| 1. High School Avg | 0.0-4.0 | 2.67 | 0.6 | 2.69 | 0.61 |
| 2. SAT Total | 400-1600 | 808.5 | 149.3 | 813.0 | 145.8 |
| 3. Gender | 0-male, 1-female | 0.55 | 0.5 | 0.54 | 0.50 |
| 4. Race | 0-all other, 1-black | 0.03 | 0.17 | 0.03 | 0.16 |
| 5. Number of DS Areas | 0-3 | 0.89 | 1.04 | 0.86 | 1.01 |

SD-Standard Deviation, DS-Developmental Studies

**College Preparatory Curriculum.** Students in the study were classified by the number of unsatisfied CPC areas they brought to Gainesville College (see Table 6). The coding scheme used the University System of Georgia's College

Preparatory Curriculum (Board of Regents, 1984) specifications as posted to their student record by the Admissions Office at Gainesville College after evaluation of their high-school transcript. The five CPC areas include four years in English, two in one foreign language, and three each in mathematics, science, and social studies. Additional information regarding the 15 required CPC courses is provided in the literature review. The primary indicator of secondary preparation used in the study was whether students had satisfied all areas of the college preparatory curriculum (0-no, 1-yes). In addition, students were coded as to the number of unsatisfied CPC areas they carried with them as they matriculated into college (0-5).

Table 6. College Preparatory Curriculum Variables and Their Coding Scales, Means, and Standard Deviations

| Variable | Coding Scale | One-Year N=1205 Mean | SD | Transfer N=369 Mean | SD |
|---|---|---|---|---|---|
| 1. All CPC Areas Satisfied | 0-no, 1-yes | 0.60 | 0.49 | 0.54 | 0.50 |
| 2. Number of Unsatisfied CPC Areas | 0-5 | 0.81 | 1.18 | 0.91 | 1.20 |

SD: Standard Deviation

**Measures of Academic Success.** The current study relied on the analyses of student records contained in the electronic database of Gainesville College. Several dependent variables were examined in the study that are associated with academic success. The first two were measured at the

end of one academic year (i.e. the end of the spring quarter after the fall quarter of entry) - cumulative grade-point average and the number of course credits earned.

The cumulative grade-point average was calculated on a four-point scale for academic credit courses only as is done by the Registrar at Gainesville College (see 1991-1993 Gainesville College Catalog), thus did not include those courses for which students received institutional credit for courses in Developmental Studies and English as a Second Language. College-level courses required by the CPC policy other than developmental courses, although taken for institutional credit only, were included in the calculation of cumulative freshman grade-point average. Earned credits were summed for *all* courses students passed with a 'D' or better to include institutional credit courses. Persistence of enrollment was measured over a three-quarter period beginning with the winter quarter after the fall quarter of entry and coded 0-3 (i.e. the winter, spring, and fall quarters after the fall quarter of entry). Wilson (1983) has shown that the best indicators of academic success often occur at the end of the freshmen year. It should be emphasized that many collegiate experiences intervene to influence college success that may contribute considerable variability between students to include remediation needs, financial difficulties, and the development of mentor relationships (see Pascarella and Terenzini, 1991). Table 7 shows the dependent measures of college success and their coding scales.

Table 7. Success Variables and Their Coding Scales, Means, and Standard Deviations: Cumulative Freshman GPA, Earned Credits, and Persistence

| Variable | Coding Scale | Mean | SD |
|---|---|---|---|
| Cumulative Freshman GPA | 0.00-4.00 | 2.21 | 0.87 |
| Earned Credits | 0-99 | 32.86 | 14.46 |
| Persistence-3 Quarters | 0-3 | 2.2 | 0.88 |

N=1205

**Transfer to Baccalaureate-Granting Institutions.** A second component of the study followed a subset of the 406 first-time full-time students who began at Gainesville College in the fall of 1988. Only those students with self-declared transfer majors (n=369) were included as opposed to those in non-transfer programs. A challenge in transfer research is to identify student goals such as the intent to transfer and follow groups accordingly. It is difficult and perhaps misleading to investigate every permutation of student types (Bers and Rubin, 1989). The use of students with transfer aspirations is consistent with the recommendation by the League for Innovation in the Community College to calculate the percentage of community college transfers who state transfer as their goal and who actually transfer (LICC, 1989). The presence of goals, however, does not indicate that they will be met. For example, a 1987 survey of graduates and nonreturning students at Los Rios Community College in California found that while 28 percent of all the respondents had transferred to a four-year college or uni-

versity, 63 percent indicated that they initially enrolled with the intention of preparing to transfer (Lee, 1987).

The 369 transfer majors in the current study were followed to both public and private institutes of higher learning over a three-year period (Fall 1988 to Fall 1991) in order to test the hypothesis that CPC completers are more likely to matriculate to a baccalaureate-granting institution than non-completers. The transfer variable is described in Table 8. The use of a dichotomous dependent variable in a multiple regression model can bias the error term in the structural equation due to its self-limiting distribution. This potential problem is reduced when the distribution of the dependent variable indicator is close to a 50/50 split (see Goodman, 1975). The standard deviation for the dichotomous transfer success variable demonstrates that such is the case in the present study.

Table 8. Transfer Success Indicator and Its Coding Scale, Mean, and Standard Deviation

| Variable | Coding Scale | Mean | SD |
|---|---|---|---|
| Transfer Success | 0-no, 1-yes | 0.48 | 0.50 |

N=369

## Data File Construction

Data Writer was used in the Office of Computer Services at Gainesville College to download information from the Student Information System to an ASCII text file. Population

data included the control variables (high-school grade average, SAT and Enhanced ACT scores, gender, and race), social security numbers, course histories, self-declared major codes, developmental studies placement codes, high-school graduation dates, and CPC codes. Transcript histories were processed by way of a computer program written by the author in Turbo Pascal 6.0 (Borland International, 1990) to determine freshman year cumulative grade average, total quarter hours earned by the end of the first spring quarter, and persistence into the second fall quarter. Only full-time (enrolled for 12 or more credit hours), first-time students who began at Gainesville College during the fall quarters of 1988, 1989, and 1990 were included in the study. Each of the students in the study had graduated from high school during the June prior to their fall quarter of entry as indicated by a field in their student record.

One hundred and two of the 1205 students (8.5%) in the study had American College Testing (ACT) assessment scores, but no SAT scores. In each case, the Enhanced ACT-English and Enhanced ACT-Math scores were converted to corresponding SAT scores according to the concordance tables issued by the Board of Regents (Board of Regents, 1989) in cooperation with the American College Testing Program. Several papers discuss the equipercentile method for the development of concordance tables for scores on the Enhanced ACT Assessment and the SAT (Langston, 1987; Marco and Abdel-fattah, 1991).

Transfer data were obtained from the University System's Longitudinal SIRS File tapes maintained by the Office of Information Technology in Athens, Georgia (Division of Academic Administration Systems, Atlanta). The longitudinal file data were selected by an InfoFetch COBOL program for those first-time students who started at Gainesville College during the fall of 1988 and brought in by modem as an ASCII text file at Gainesville College. A Pascal program was written by the author to determine whether the student had transferred to a baccalaureate-granting unit within the University System over the three-year study period (0-no, 1-yes). Transfer data were merged with the previously constructed student data using Paradox 3.5 (Borland International) by matching social security numbers. Students with self-declared majors indicating that they were pursuing an associate of science or an associate of arts degree were coded as transfer majors, whereas those students with majors leading to an associate of applied science degree were treated as nontransfer majors.

In addition to the System transfer data described above, a file was obtained, with the assistance of the Registrar at Gainesville College, containing all the transcript mailout addresses requested by students over the three-year study period. This file was coded by social security number and integrated with the student database information by Paradox 3.5 (Borland International, 1990). If a student did not transfer to a baccalaureate-granting institution within the

University System, then the transcript mailout file was examined. Public and private colleges and universities to which the remaining students requested that transcripts be sent were contacted to determine if the students transferred to any of the institutions listed within the three-year study period. If they did transfer, then they were coded accordingly. This approach helped to address the concern that the longitudinal file data do not contain information concerning transfer activity to public and private colleges and universities outside of the University System of Georgia.

The data sets were converted to StatGraphics 5.0 (Statistical Graphics Corporation, 1991) files for statistical analysis.

## Analytical Procedures

Coefficients in the causal model were analyzed using multiple regression analysis. This technique was used to detect the relative contribution of CPC completion on success measures while controlling for the background and intervening variables. The larger the correlation coefficient in absolute terms, the stronger the linear association. In order to determine the effects of developmental studies as an intervening variable, the control variables and CPC completion were first regressed against the number of developmental studies areas, then the independent variables to include developmental studies were regressed

against the success measures to yield the final set of structural equations. These steps produced standardized regression coefficients (beta weights) that can be interpreted as direct effects, as well as, coefficients of multiple determination or $R^2$ correlations. The magnitude and sign of the standardized regression weights indicate the amount of positive or negative change in the dependent measure for every unit standard deviation increase in the predictor variable while holding constant the influence of the other predictors in the structural equation (Lewis-Beck, 1980).

Beta weights permit judgments about the relative importance of each of the variables within a structural equation. Their values, however, are contingent on the other variables in the equation and affected by intercorrelations with the dependent variable. As a result, comparisons of the importance of the independent variables do not reflect absolute statistical judgments and should be approached with some caution (Norusis, 1982). The $R^2$ for a multiple regression equation indicates the proportion of variation in the dependent variable that is "explained" by all the independent variables. The higher the $R^2$, the greater the implication that the phenomenon under study has been explained (Lewis-Beck, 1980). One should recognize that the multivariate technique exerts statistical control as opposed to experimental control when it holds constant the independent variables in a regression. Nevertheless, the multivariate approach is a powerful tool by which the investigator can

separate the effect of one independent variable from the distorting effects of others by examining the formulas for partial regression slopes.

The use of models using path analysis and multiple regression is a popular approach to quantifying and interpreting causal theory (Wolfle, 1985). Using this approach, the total effects of an independent variable on an outcome can be decomposed into constituent direct and indirect effects. The total effect of one variable on another is the part of their total association which is neither due to spurious (or noncausal) causes or to unanalyzed correlation. A total effect reveals the degree of change in a dependent variable that is induced by a given shift in an antecedent variable, regardless of the change mechanism. Total effects may be expressed as the sum of the direct and indirect effects. Indirect effects are those parts of a variable's total effects which are mediated by variables that intervene between the cause and effect of interest in a causal model. Indirect effects reveal the extent to which the manipulation of an antecedent variable leads to changes in the intervening variable which in turn changes the consequent or outcome variable. Indirect causal effects are estimated by the sum of the products of standardized coefficients indicating causal effects through intervening variables. The direct or unique effect of a variable on another is that part of its total effect which is not transmitted via intervening variables. Direct effects are estimated with standardized re-

gression coefficients (also called beta weights). The relationship betwen variables is specified by the causal model (Alwin and Hauser, 1975). The data were further analyzed for the possibility of gender differences.

In addition, a bivariate analysis was conducted comparing those who had fully completed the CPC with those who had one or more unsatisfied areas for both the one-year and the three-year transfer study. The analysis applied Chi-Square Goodness-of-Fit Tests for contingency tables and two-tailed t-tests using StatGraphics 5.0 to investigate a variety of characteristics associated with the students in the study group: SAT scores, high-school averages, freshman grade point averages, developmental studies placement, earned credit hours at the end of the first academic year, one-year persistence patterns, and transfer activity.

## IV. Results

The bivariate relationships among indicators focusing on CPC-completers and non-completers are described first. A multiple regression technique is then employed to analyze the impact of satisfying the college preparatory curriculum in high school on selected college outcomes. The data are further analyzed for gender differences. Subsets were not analyzed on the basis of race as the small number of Blacks destabilized the multiple regression analysis yielding insignificant $R^2$ values in all cases and unreliable regression coefficients.[5]

### Bivariate Analysis

Within the University System of Georgia, the efficacy of the CPC is generally approached using descriptive statistics that split the sample into two groups: those that have fully satisfied all CPC areas (CPC-S) and those that have one or more unsatisfied areas (CPC-NS) (see Board of Regents, June

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[5]Unless otherwise indicated, similar statistical results were obtained with the multivariate model using either completion of all CPC areas or the number of unsatisfied CPC areas as the independent variable. For the sake of simplicity and to prevent repetition of essentially the same results, CPC-completion is the predominant variable used in the tables shown throughout the results section.

1991). This is the approach with which decisions concerning the value of the curriculum are made and the approach used by local school systems (see System and School Profiles, Hall County School System). It is apparent from the following bivariate analysis that this approach yields dramatically different and highly significant results concerning the two groups with respect to precollege variables and academic performance in college. Students who have completed all CPC areas prior to entering college have significantly higher SAT scores and high-school grade averages. In addition, CPC-Satisfied students as compared to CPC-Not Satisfied students have higher cumulative freshman grade-point averages and have more earned credit hours after one academic year. Moreover, they are more likely to persist one year later, enroll in summer courses at Gainesville College, and transfer within a three-year period to a baccalaureate-granting institution.

The major problem with this approach is that it presents a misleading impression that the differences can be solely attributed to the full satisfaction of the CPC entrance requirements rather than to other factors that simultaneously affect the same variables. Too often, these other variables are not taken into account in a two-variable analysis. The bivariate analysis is a reasonable starting position when considering differences between the CPC-Satisfied and CPC-Not Satisfied groups, but it is incapable of providing a good understanding of the variance.

Table 9. Differences between CPC-S and CPC-NS students on SAT Scores, High-School Averages, and Cumulative Freshman Grade Average.

| | Total | CPC-S Mean | CPC-S SD | CPC-NS Mean | CPC-NS SD | Sig. Level |
|---|---|---|---|---|---|---|
| SAT | 808.5 | 862.9 | 137.4 | 727.9 | 128.2 | *** |
| SATM | 420.5 | 454.0 | 83.1 | 370.8 | 74.7 | *** |
| SATV | 388.0 | 408.9 | 74.0 | 357.1 | 75.3 | *** |
| HSA | 2.67 | 2.93 | .47 | 2.29 | .55 | *** |
| Frshmn GPA | 2.21 | 2.42 | .83 | 1.90 | .82 | *** |

N-1205 (CPC-S: 719, CPC-NS: 486)
Note: Comparisons for CPC-S versus CPC-NS, ***p≤.001
CPC-S: All CPC areas satisfied, CPC-NS: One or more CPC areas not satisfied, HSA-High-School Grade Average, SD-Standard Deviation

**SAT Scores, High-School Grade Average, and Cumulative Freshman GPA:** A two sample analysis of the data by SAT scores, high-school grade average, and cumulative freshman grade-point average is shown in Table 9. Statistics were run on the 1205 first-time, full-time students in the one-year study. A two-sample test was performed on only the transfer activity for the 369 students in the three-year transfer study. Gainesville College students who have satisfied all areas of the CPC had significantly higher SAT scores and high-school grade averages ($p \leq .001$) than those with one or more unsatisfied areas of the college preparatory curriculum. On this basis, it appears clear that CPC-Satisfied students enter Gainesville College with greater aptitude and motivation for achieving academic success at Gainesville College.

The above results correspond with the striking difference in cumulative freshman grade average that was measured

between the CPC-Satisfied and CPC-Not Satisfied groups. By the end of one academic year of college study, CPC-Satisfied students had a grade average of 2.42, whereas the grade average of CPC-Not Satisfied students was a 1.90. Although the criterion for academic probation varies depending on the number of quarter hours attempted, in general, students with cumulative grade-point averages below 2.0 are at risk of losing their good standing. This appears to be a more likely prospect for those students who enter Gainesville College without having completed all areas of the CPC in high school.

Table 10. Developmental Studies Placements for CPC-S and CPC-NS groups.

| | Total | | CPC-S | | CPC-NS | | |
|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | Chi-Square |
| N | 1205 | 100.0 | 719 | 100.0 | 486 | 100.0 | 45.05 *** |
| No DS | 580 | 48.1 | 478 | 66.5 | 102 | 21.0 | 243.75 *** |
| >=1 DS | 625 | 51.9 | 241 | 33.5 | 384 | 79.0 | 32.72 *** |
| DSR | 275 | 22.8 | 101 | 14.0 | 174 | 35.8 | 19.38 *** |
| DSE | 325 | 27.0 | 130 | 18.1 | 195 | 40.1 | 13.00 *** |
| DSM | 475 | 39.4 | 140 | 19.5 | 335 | 68.9 | 80.05 *** |
| D-DSM | 324 | 26.9 | 125 | 17.4 | 199 | 40.9 | 16.90 *** |
| B-DSM | 151 | 12.5 | 15 | 2.1 | 136 | 28.0 | 96.96 *** |

Note: Chi-Square Goodness-of-Fit Test (DF = 1) applied to CPC-S versus CPC-NS groups. ***p≤.001.
CPC-S: All CPC areas satisfied, CPC-NS: One or more CPC areas not satisfied
DS: Developmental Studies, R-Reading, E-English, M-Math (D-DSM 011, B-DSM 010)

**Developmental Studies Placement:** Large disparities in developmental studies placements existed between the CPC-

Satisfied and CPC-Not Satisfied students as shown in Table 10. In each of the categories displayed, a higher percentage of those students with unsatisfied CPC areas placed into developmental courses (79.0%) as compared to CPC-Satisfied students (33.5%). It is of interest to note that almost 70 percent (68.9%) of the CPC-Not Satisfied group placed into developmental studies mathematics and of that group 40.6 percent (136/335) required the lower-level remedial math course. The data indicate that students with unsatisfied CPC areas have a much heavier burden of institutional credit courses that they must pass with a 'C' or better within their first 30 credit hours when one considers their multiple unsatisfied CPC areas combined with their developmental needs. A bivariate comparison of the number of developmental studies courses into which students placed reveals highly significant ($p \leq .001$) differences between the CPC-Satisfied (33.5%) and CPC-Not Satisfied (79.0%) groups.

**Earned Credit Hours:** Entering full-time students who had completed the CPC were much more likely across the first academic year to earn more credit hours than those who had one or more unsatisfied CPC areas (see Table 11). Almost one out of four (24.3%) of the CPC-Not Satisfied students earned on average 8.4 credit hours at the end of one academic year, compared with only 12 percent of the CPC-Satisfied students. Similar percentages of students in the CPC-Satisfied and CPC-Not Satisfied groups earned 31 to 45 credit hours. However, the percentage of CPC-Satisfied students who earned

Table 11. Earned Credits Over One Academic Year by Credit Hour Categories for CPC-S and CPC-NS Students.

| | Total | | | CPC-S | | | CPC-NS | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Earned Hrs | N | % | Avg Hrs | N | % | Avg Hrs | N | % | Avg Hrs | Chi-Square |
| Total' | 1205 | 100.0 | 32.9 | 719 | 100.0 | 37.3 | 486 | 100.0 | 26.3 | 45.05 *** |
| 0 to 15 | 202 | 16.8 | 8.6 | 84 | 11.7 | 9.0 | 118 | 24.3 | 8.4 | 5.72 * |
| 16 to 30 | 261 | 21.7 | 23.5 | 97 | 13.5 | 23.6 | 164 | 33.7 | 23.4 | 17.20 *** |
| 31 to 45 | 451 | 37.4 | 38.6 | 273 | 38.0 | 39.2 | 178 | 36.6 | 37.7 | 19.38 *** |
| > 45 | 291 | 24.1 | 49.2 | 265 | 36.9 | 49.3 | 26 | 5.3 | 48.2 | 196.29 *** |

Note: Chi-Square Goodness-of-Fit Test (DF=1) applied to the number of students in the CPC-S versus CPC-NS groups. *p≤.05, ***p≤.001. '-Total average earned hours are different (p≤.001) for CPC-S (SD=13.7) versus CPC-NS (SD=13.0) groups.
CPC-S: All CPC areas satisfied, CPC-NS: One or more CPC areas not satisfied
Earned Hours - All credit course hours for which a student received a 'D' or better to include DS courses. Earned hours computed after first academic year.

more than 45 credit hours (36.9%) was seven times greater than the CPC-Not Satisfied students (5.3%). Strikingly, the total average credit hours earned after one academic year was significantly higher (p≤.001) for the CPC-Satisfied students (37.3 credit hours) as compared to the CPC-Not Satisfied students (26.3 credit hours). The 11 credit disparity between the two groups represents two five-credit hour courses.

The number of credit hours does not necessarily reflect academic credits, since institutional credit courses were included in this compilation. It is likely that CPC-Satisfied students who have on average fewer institutional credit course needs have more earned hours in regular placement courses that would count towards graduation than CPC-Not

Table 12. One-Year Persistence Patterns by Quarter for CPC-S and CPC-NS Groups.

| Quarters | Total N | Total % | CPC-S n | CPC-S % | CPC-S SD | CPC-NS n | CPC-NS % | CPC-NS SD | Sig. Level |
|---|---|---|---|---|---|---|---|---|---|
| Fall (First) | 1205 | 100.0 | 719 | 100.0 | - | 486 | 100.0 | - | - |
| Winter | 1109 | 92.0 | 665 | 92.5 | 0.26 | 444 | 91.4 | 0.28 | |
| Spring | 955 | 79.3 | 603 | 83.9 | 0.37 | 352 | 72.4 | 0.45 | *** |
| Summer | 342 | 28.4 | 230 | 32.0 | 0.47 | 112 | 23.0 | 0.42 | *** |
| Fall | 584 | 48.5 | 375 | 52.2 | 0.5 | 209 | 43.0 | 0.5 | * |

Note: Comparisons for CPC-S versus CPC-NS, *p≤.05, ***p≤.001
CPC-S: All CPC areas satisfied, CPC-NS: One or more CPC areas not satisfied
SD: Standard Deviation
Quarters: Fall-First Fall Quarter student enrolled, then subsequent quarters

Satisfied students. The data indicate that CPC-completers are making more progress towards degree attainment in terms of credit hours accumulated than those students who entered with unsatisfied CPC areas.

**One-Year Persistence:** Table 12 presents the persistence rates of CPC-Satisfied and CPC-Not Satisfied students over a five-quarter period from the fall quarter of entry to the next fall quarter. Almost equal percentages of the students (about 92%) from both groups were enrolled during the winter quarter. However, the persistence patterns of CPC-Satisfied versus CPC-Not Satisfied groups began to diverge significantly after the winter quarter with the gap continuing through summer and their second fall quarter. Those students in the CPC-Not Satisfied group were less likely to persist from the winter quarter onward than CPC-completers. Over one out of two (52.2%) of the CPC-completers returned one year

later during the fall, while significantly fewer of the CPC-noncompleters did the same (43.0%).

**Transfer to a Baccalaureate-Granting Institution:** Table 13 shows the transfer rates for CPC-Satisfied (n=199) as compared to CPC-Not Satisfied (n=170) students who began as full-time students at Gainesville College in the fall of 1988 and who had self-declared transfer majors. Over a three-year period, the CPC-Satisfied students (63.8%) expressed as a percentage of the whole were twice as likely to transfer as the CPC-Not Satisfied group (30.0%). Although it is possible that some of the CPC-Not Satisfied students are simply delaying transfer beyond the three-year period used in the study, the differences in rates of transfer are still striking and the magnitude of the difference is relatively large. It is evident from Table 13 that the majority of students transferred to units within the University System and that these students alone yield a meaningful indicator of transfer activity. This is underscored by the observation that the ratio of CPC-Satisfied to CPC-Not Satisfied students changes slightly from 2.6 (113/44) to 2.5 (127/51) when one considers those who transferred to an out-of-System institution. Appendix 1 shows institutions outside of the University System of Georgia to which students transferred.

Table 13. Three-Year Transfer Activity to Baccalaureate-Granting Institutions for the CPC-S and CPC-NS Students who Started at Gainesville College During the Fall of 1988.

| | Total | | CPC-S | | CPC-NS | | |
|---|---|---|---|---|---|---|---|
| | N | % | n | % | n | % | Chi-Square |
| Totals | 369 | 100.0 | 199 | 100.0 | 170 | 100.0 | 2.28 |
| Not 4-Yr Transfer | 191 | 51.8 | 72 | 36.2 | 119 | 70.0 | 11.57 *** |
| 4-Yr Transfers | | | | | | | |
| USG units | 157 | 42.5 | 113 | 56.8 | 44 | 25.9 | 30.32 *** |
| Outside USG | 21 | 5.7 | 14 | 7.0 | 7 | 4.1 | 2.33 |
| Total Transfers | 178 | 48.2 | 127 | 63.8 | 51 | 30.0 | 32.45 *** |

Note: Chi-Square Goodness-of-Fit Test (DF=1) applied to CPC-S versus CPC-NS groups. ***p≤.001.
CPC-S: All CPC areas satisfied, CPC-NS: One or more CPC areas not satisfied; USG: University System of Georgia

A supplementary analysis of the 369 transfer major students investigated the number of academic (i.e. non-institutional) credits they had earned at Gainesville College over the three-year study period. The analysis revealed that only 15.4 percent (n=57) of all the students earned 15 or fewer academic credits and of those 6 transferred and 2 were enrolled at Gainesville College during the fall of 1991. Twenty percent (n=74) of the students earned from 16 to 45 credit hours at Gainesville College and of those 16 transferred to a four-year unit of the University System, while 6 were enrolled at Gainesville College in the fall of 1991. By far the majority of the students (n=238 or 65%) in the transfer study had earned more than 45 academic credits over the three-year study period. Of these, 46 were still enrolled at Gainesville College during the fall of 1991, 82 had earned an associate degree from Gainesville College, and 135 had transferred to a four-year college or university

within the System. If one subtracts the 46 students who were still enrolled at Gainesville College during the fall of 1991 from the total of 369 students and divides the resultant 323 students into the 178 unduplicated transfers, then the overall transfer rate for "leavers" is 55.1 percent. Of the 135 students who had transferred, 96.2 percent had earned more than 16 credit hours at the receiving institution. Four units of the University System of Georgia (three of which are within 50 miles of Gainesville College) accounted for 86 percent of transfer activity: The University of Georgia (40%), North Georgia College (30%), Georgia Southern University (9%), and Georgia State University (7%).

It is clear that the majority (n=135) of those students who transferred (n=157) did so after earning at least a freshman year's worth of academic credit (i.e. >45 credits). Furthermore, only 12.5 percent of the 369 students in the transfer study were enrolled at Gainesville College during the fall of 1991 suggesting that most of the initial 369 students in the study had either transferred or suspended their studies at least for the fall of 1991 quarter.

### One-Year Study: Multivariate Analysis

**Correlations:** Table 14 presents the means, standard deviations, and zero-order correlations for the 1205 first-time, full-time students in the one-year study. CPC completion correlates significantly ($p \leq .05$) with all of the independent and dependent variables in the model. The relation-

Table 14. Pearson Product-Moment Correlation Coefficient Matrix for Control, CPC, DS, and Success Variables.

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| 1. CPC-Satisfied | 1 | | | | | | | | |
| 2. High-School Avg | .52 | 1 | | | | | | | |
| 3. SAT Total | .44 | .49 | 1 | | | | | | |
| 4. Female | .06 | .19 | -.11 | 1 | | | | | |
| 5. Black | -.09 | -.08 | -.16 | .01 | 1 | | | | |
| 6. Number of DS Rqts | -.44 | -.46 | -.73 | .02 | .16 | 1 | | | |
| 7. Freshman Cum GPA | .29 | .51 | .34 | .16 | -.03 | -.25 | 1 | | |
| 8. Earned Credits | .37 | .47 | .35 | .13 | -.08 | -.32 | .62 | 1 | |
| 9. Persistence | .12 | .19 | .09 | .07 | .01 | -.04 | .34 | .66 | 1 |
| Mean | .60 | 2.67 | 808 | .55 | .03 | .89 | 2.21 | 32.9 | 2.20 |
| Standard Deviation | .49 | .60 | 149 | .50 | .17 | 1.04 | .87 | 14.9 | .88 |

N = 1205; Correlations greater than .05 absolute value and over are significant at $p \leq .05$
Earned Credits - Credits earned in one academic year (Fall, Winter, and Spring)
DS-Developmental Studies

ship was positive in all cases except for Blacks and the number of developmental studies requirements, suggesting that the latter two categories of students are more likely to have unsatisfied CPC areas in high school. It is of interest to note that CPC completion correlates with the dependent variables in a manner similar to that of SAT scores and at a level only somewhat lower than that for high-school grade average. The correlation matrix suggests that CPC completion is an indicator of the college performance indicators posed in the regression model. However, as will become apparent later in this chapter, the unique contribution of each independent variable when they are correlated with each other is better assessed with a multivariate approach.

High-school grade average and SAT scores are highly and significantly correlated ($p \leq .05$) with CPC completion (.52 and .44, respectively). High-school grade average and SAT scores are also highly correlated (.49) with each other. These three variables, high-school grade average, SAT scores, and fully satisfying all CPC areas are intercorrelated to the extent that each alone is at least partially a function of the other. They may be overlapping indicators. The intercorrelations of these variables with each other, however, are not so high as to violate the multivariate assumption of the absence of perfect multicollinearity where $R^2$ equals 1.0. Lewis-Beck (1980) asserts that with social science data the independent variables are almost always intercorrelated and $R^2$ values as high as .49 are still a "good distance from 1.0," hence do not pose a statistical problem (p.61).

Freshman cumulative grade-point average, the number of earned credits, and persistence were positively and significantly correlated with most of the independent variables. The only exceptions were freshman grade-point average and persistence with race. The data suggest that female students with higher SAT scores and high-school grade averages who satisfied all CPC areas did better with respect to the three educational outcomes used in the study as compared to those without these characteristics. The strong correlations between earned credits, freshman grade-point average, and persistence suggest that academically stronger students earn

Table 15. Regressions for the CPC Causal Model: DS, Freshmen Cumulative GPA, Earned Credits, and Persistence

| Independent Variables | Beta Weights Number of DS Areas | Freshmen Cum GPA | Earned Credits | Persistence |
|---|---|---|---|---|
| CPC-Satisfied | -.11*** | .02 | .14*** | .05 |
| | (-.232) | (.040) | (4.14) | (.086) |
| High-School Avg | -.08** | .42*** | .31*** | .18*** |
| | (-.134) | (.608) | (7.46) | (.258) |
| SAT Total | -.64*** | .22*** | .13*** | .06 |
| | (-.004) | (.001) | (.013) | (.0003) |
| Female | -.03 | .10*** | .07** | .04 |
| | (-.060) | (.173) | (2.18) | (.062) |
| Black | .04* | .02 | -.02 | .02 |
| | (.267) | (.106) | (-1.84) | (.103) |
| Number of DS Areas | NA | .11** | -.01 | .11* |
| | | (.094) | (-.165) | (.092) |
| $R^2$ | .56*** | .28*** | .26*** | .04*** |

N=1205
*p≤.05, **p≤.01, ***p≤.001
Standardized regression coefficients are presented with unstandardized regression coefficients shown parenthetically
NA-Not applicable

more credit and doing so requires that they persist at Gainesville College from one quarter to the next.

Table 15 and Figure 2 present the regression results for the structural equations of the path analysis showing the effects of the independent variables on developmental studies placement, freshman cumulative grade-point average, earned credits, and persistence into the second year. The following sections discuss each of the structural equations.

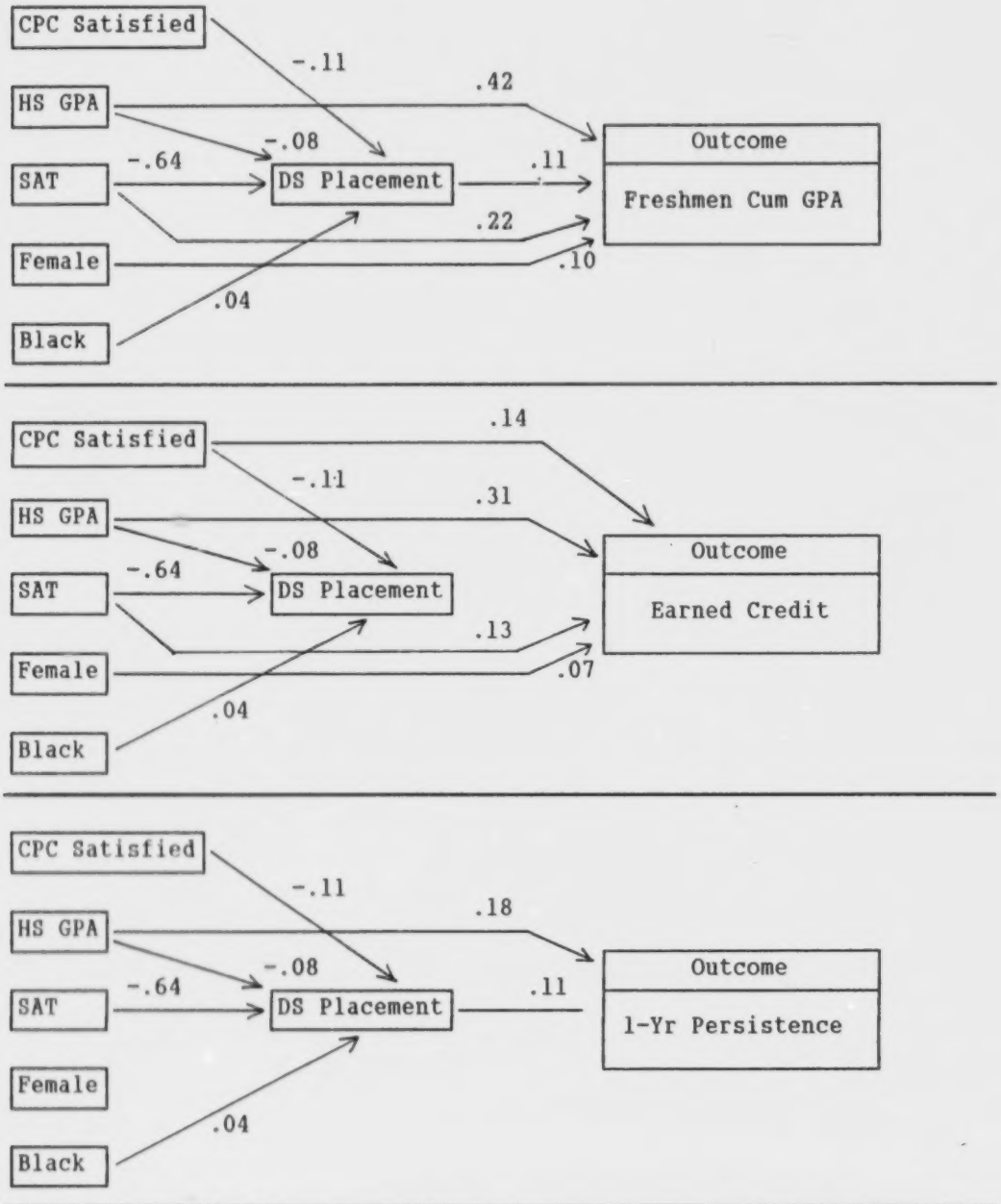


Figure 2. Significant path analysis results for one-year persistence, cumulative freshmen grade-point average, and completion of college credit (N=1205). Only significant paths ($p \leq .05$) are shown with corresponding standardized regression coefficients. All standardized coefficients (significant and nonsignificant) are shown in Table 15. Note: When the number of unsatisfied CPC areas is substituted for full CPC area completion in the causal model analysis for one-year persistence, then the beta weight (-.08) for this variable's affect on persistence is significant ($p \leq .05$).

**Developmental Studies Placement:** The results indicate that CPC completion ($r$=-.11), high-school grade average ($r$=-.06), and SAT scores ($r$=-.64) influence developmental studies placement in a negative manner, whereas black students ($r$=.04) tend to be more likely to place into developmental courses. Since SAT scores are the determinant as to whether students take the college placement exam which in turn results in placement, it is not surprising to observe that it has the most significant effect on the number of developmental studies requirements when the effects of the other variables are controlled. Completion of the CPC in high school is inversely related to developmental studies placement. Lower high-school grade averages, lower SAT scores, and failure to complete all the CPC areas in high school are associated with students requiring developmental courses in college. Gender is not significantly related to developmental studies placement when the other variables are held constant. Overall, 56% of the variance in developmental studies placement was explained by factors included in the model.

**Freshman Cumulative Grade-Point Average:** Freshman cumulative grade-point average was significantly affected by several of the exogenous variables in the structural equation. The model explained 28 percent of the variation. Completion of the CPC in high school was not among the significant factors, however. As suggested by the literature, high-school grade average and SAT scores contribute to

higher grade-point averages at Gainesville College. Furthermore, females tend to do better with respect to this indicator than males, net of other influences. In this specification of the causal model, the standardized regression coefficient for CPC completion was an unimpressive .02. This relatively small and insignificant value suggests that CPC's value as a direct contributor to improving freshman year grade-point averages is negligible. CPC completion cannot be considered a reliable predictor of this indicator of college success when it is considered along with the other variables in the model. Nevertheless, it should be noted that at the end of the first academic year, those students with unsatisfied CPC areas had accumulated fewer credit hours than those students who had satisfied all CPC areas. Hence, the freshman grade-point average as calculated in the study may reflect student performance only in a relatively small percentage of the System's core curriculum.

Interestingly, the results indicate that freshman grade-point average increases along with the number of developmental studies courses a student is required to take after statistically adjusting for all other variables in the model. In contrast, the correlation matrix indicates that the association between developmental studies placement needs and cumulative freshman grade-point average is negative, yet the sign reverses when the other variables in the model are statistically controlled. This curious result may be explained in part by several factors. Developmental

studies students would be expected to take fewer regular credit courses as the number of developmental studies requirements increased. Furthermore, developmental studies students are required to complete all developmental courses within their first 30 hours (developmental studies students are advised to take no more than 12 credit hours while enrolled in a developmental studies course). One might expect then that cumulative grade-point average might be positively affected for those students taking fewer college credit courses when the influence of other variables is factored out. Developmental studies students might do better in their academic credit courses because of the reduced load (i.e. they have fewer grading opportunities than those without developmental studies needs). In addition, those students in the developmental studies program may have benefit from its supportive environment that attempts to improve their study skills and provides extensive tutoring services. Then too, developmental studies courses are taught at the high-school level, thus are easier than regular placement courses.

**First Academic Year Earned Credits:** The regression model for earned credits explained 26 percent of the total variance. Several of the variables related significantly and positively to this measure of college success: CPC completion, high-school grade average, SAT total, and gender. CPC completion uniquely contributed about 2 percent of the explained variance as did SAT score. This additional boost

contributed by CPC completion is considerably smaller in magnitude than the 10 percent of explained variance from high-school grade average, nevertheless it does reflect a significant edge that CPC completers have over CPC noncompleters.

One might infer from this finding that students are more likely to take additional credit hours at Gainesville College if they completed all areas of the CPC in high school. CPC's positive impact on earned credits at Gainesville College over the first academic year gains added significance when one considers that CPC-completers are less likely to have developmental studies needs. Hence CPC-completers are much more likely to be taking more academic credit courses than noncompleters, thus making more progress towards their degree objective over the same period of time.

**Persistence Over the First Year:** The only independent variables that significantly affected whether students continued to attend Gainesville College on a steady basis over a three quarter period beyond their fall quarter of entry (excluding the summer) were high-school grade average and the number of developmental studies areas into which the student placed. This finding is somewhat surprising given that the correlation matrix indicated significant associations ($p \leq .05$) between most of the independent variables and the measured outcomes with the exception of race and developmental studies placement needs. The model accounted for only four percent of the explained variance which is consid-

erably less than the models used for the other two outcomes. Similar to its relationship to the other dependent variables, high-school grade average, a measure of student performance, consistently showed its predictive power.

As was the case for freshmen cumulative grade-point average, the number of developmental studies areas into which the student placed tends to relate positively to persistence despite the negative association indicated by the correlation matrix. Thus, it appears that developmental studies placement needs keep students attending for longer periods of time, all else equal.

When full satisfaction of the CPC is used as the independent variable, it appears that a positive influence of CPC completion on students in college may come through earned credits rather than persistence. However, when the use of the number of unsatisfied CPC areas is substituted for CPC-completion in the causal model analysis, the relationship between CPC and persistence becomes significant ($p \leq .05$). In this case, the beta weight (-.08) indicates an inverse relationship between an increasing number of unsatisfied CPC areas and the likelihood that a student will continue to enroll over their first year of study. Thus, whether a student has or has not completed all the CPC requirements may give a false sense of CPC's impact on persistence. This is overcome to some degree by using an indicator that better estimates CPC's influence on student progress. The data suggest that CPC has a significant impact

on both persistence and earned credits during the freshmen year over and above the other independent variables used in the causal model.

**Gender Differences:** Gender differences concerning the relationship of the independent variables on academic outcomes to college are displayed in Table 16. The results for freshman grade-point average differed somewhat from the full causal model. The model's predictive value was somewhat higher for females ($R^2$=.34) than males ($R^2$=.20). In addition, the number of developmental studies requirements was significantly related to freshman grade average for males, but not for females. Moreover, SAT scores of females are significantly and positively related with earned credits after one academic year, whereas the relationship between the two variables is not significant with males. In both sexes, the highly significant impact of CPC completion on the number of earned credits was the same.

As was the case for earned credits, SAT scores appeared to be a significant influence on one-year persistence when other variables were statistically controlled for females only. In addition, the positive influence of developmental studies held only for females and did not appear to be significantly related to persistence for males.

While full satisfaction of the CPC in high school was not related to persistence, significant relationships were revealed when the number of unsatisfied CPC areas was used in the regression. In this instance, the persistence rate of

the 537 males ($r$=-.12, p≤.05) was significantly related to persistence when other variables were held constant, while the relationship was not significant for females ($r$=-.05). Thus it appears that the impact of the number of unsatisfied CPC areas is a reduction in male persistence.

Table 16. Summary of Effects of Independent Variables on Cumulative Freshmen Grade Average, Earned Credits After One Academic Year, and One-Year Persistence for the Male and Female Subsamples.

| Variables | Freshmen GPA | | Earned Credits | | Persistence | |
|---|---|---|---|---|---|---|
| | Female | Male | Female | Male | Female | Male |
| CPC-Satisfied | .06 | -.01 | .14*** | .14** | .01 | .07 |
| High-School Avg | .45*** | .39*** | .32*** | .30** | .16** | .18*** |
| SAT Total | .21*** | .23*** | .18*** | .08 | .17** | -.06 |
| Female | NA | NA | NA | NA | NA | NA |
| Black | .00 | .05 | -.03 | -.01 | .01 | .03 |
| Number of DS Areas | .08 | .15* | .05 | -.08 | .15** | .05 |
| $R^2$ | .34*** | .20*** | .26*** | .24*** | .05*** | .04*** |

N=Females-668, Males-537
*p≤.05, **p≤.01, ***p≤.001
Standardized regression coefficients are presented
NA-Not applicable

**Indirect and Total Effects:** The causal model proposed that developmental studies placement needs would negatively affect all the measured educational outcomes when the other variables were held constant. Such was not the case, however. With the exception of earned credits, placement into developmental studies had a direct positive effect on freshman grade-point average and persistence (p≤.05) when the other variables were held constant. Developmental studies, however, did not serve as a powerful mediator of the total

effects of the independent variables on any of the three outcomes. Table 17 summarizes direct, indirect, and total effects of the independent variables on the college outcomes.

The bulk of the effect of an independent variable on the endogenous variables in the model was direct. In most cases, the independent variables transmitted little, if any, effects on the outcomes via placement into developmental studies courses. In the case of freshman grade-point average and persistence the intervening variable served in a suppressor role as evidenced by the negative direction of the indirect effects, decreasing the total effect of most of the independent variables. For example, the total effect of high-school average on freshman grade-point average was .41 of which -.01 was contributed via developmental studies placement and .42 was direct. The total effect of SAT scores on freshman grade-point average and persistence, when mediated through developmental studies, was diminished although still significant.

The suppressor role of developmental studies as an intervening variable in this model is consistent with the observation that the independent variables (with the exception of race) are negatively associated with developmental studies placement, whereas development studies in the full structural equation is positively associated with the educational outcomes. Hence, the product of the two - the

Table 17. Direct, Indirect, and Total Effects on GC GPA, Earned Credits, and Persistence. Indirect Effects through Developmental Studies.

| Var | GC GPA | | | Earned Credits | | | Persistence | | |
|---|---|---|---|---|---|---|---|---|---|
| | Direct | Indrct | Total | Direct | Indrct | Total | Direct | Indrct | Total |
| CPC-S | .02 | -.01 | .01 | .14*** | .00 | .14*** | .05 | -.01 | .04 |
| HSA | .42*** | -.01 | .41*** | .31*** | .00 | .31*** | .18*** | -.01 | .17*** |
| SAT | .22*** | -.07 | .15*** | .13*** | .01 | .14*** | .06 | -.07 | -.01 |
| Female | .10*** | -.00 | .10*** | .07** | .00 | .07** | .04 | -.00 | .04 |
| Black | .02 | .00 | .02 | -.02 | .00 | -.02 | .02 | .00 | .02 |
| DS Areas | .11** | | .11** | -.01 | | -.01 | .11* | | .11* |

Note: *p≤.05,*≤.01,***p≤.001
Significance levels for total effects were determined by the blocking approach described by Alwin and Hauser (1975). If a variable in a block of variables was significant in an equation using that block of variables and all variables in causally prior blocks, then significance for total effects was inferred.

indirect effect - is a negative coefficient. Moreover, the indirect effect is, in general, relatively small.

## Three-Year Transfer Study

The second component of the study dealt with a subset (n=369) of the 406 students who began at Gainesville College in the fall of 1988. Only those with self-declared transfer majors were followed over a three-year period to determine whether they transferred to a private or public senior college or university. Table 18 presents the means, standard deviations, and correlations for the 369 first-time, full-time students with self-declared transfer majors in the three-year transfer study (fall of 1988 through the fall of 1991). Fifty-four percent of the students in the transfer study who started at Gainesville College during the fall of 1988 had completed all areas of the college preparatory

curriculum in high school. The data indicate that a relatively large percentage of the students in the transfer study, almost one out of two (48%), transferred to a baccalaureate-granting institution over the three-year study period. CPC completion correlates with high-school grade average, SAT total, the number of developmental studies placement areas, and the three-year transfer rate. All independent variables have significant associations with the three-year transfer variable. These zero-order correlations were positive, except for race and the number of developmental studies areas into which students placed as they entered Gainesville College.

It is likely that a significant number of students who will transfer have done so over the three-year study period. A five-year longitudinal study of 448 first-time students with transfer majors who started at Gainesville College in the fall of 1984 revealed that most of the matriculation to the four senior colleges and universities occurred by the second (59%) and third (84%) year (Hamilton, 1990a). Only 16 percent of the students who transferred during the five-year period (fall of 1984 to fall of 1988) did so after the third year. Additional evidence that students at Gainesville College tend to make significant progress towards their educational goals in a timely fashion comes from an analysis of June 1990 graduates (Hamilton, 1990b). Data indicated that the median time to complete an associated degree was 2.5 years, while the average number of years was 2.3.

Table 18. Pearson Product-Moment Correlation Coefficient Matrix for Control, CPC, DS and Three-Year Transfer Rate.

| Variable | Stsfd CPC | HSA | SAT | Female | Black | DS | 3-Yr Trnsf |
|---|---|---|---|---|---|---|---|
| 1. CPC Satisfied | 1 | | | | | | |
| 2. High-School Avg | .47 | 1 | | | | | |
| 3. SAT Total | .51 | .49 | 1 | | | | |
| 4. Female | .06 | .22 | -.07 | 1 | | | |
| 5. Black | -.05 | -.07 | -.16 | .05 | 1 | | |
| 6. Number DS Areas | -.47 | -.45 | -.75 | .01 | .17 | 1 | |
| 7. 3-Yr Transfer | .34 | .38 | .33 | .10 | -.09 | -.33 | 1 |
| Mean | .54 | 2.69 | 813.0 | .54 | .03 | .86 | .48 |
| Standard Deviation | .50 | .61 | 145.8 | .50 | .16 | 1.01 | .50 |

N = 369
Correlations over .08 absolute value are significant at p ≤.05
DS-Developmental Studies, HSA-High-School Grade Average

Table 19 and Figure 3 present the structural equation solutions for the path analysis showing the effects of the independent variables on the three-year transfer rate. Completion of all areas of the CPC had a statistically significant (p≤.05) effect on whether students transferred within the three-year time frame of the study explaining approximately two percent of the variance in the model. Furthermore, when the number of unsatisfied CPC areas replaces full completion of the CPC in the multivariate analysis, the relationship between CPC and transfer activity is statistically strengthened (p≤.001) and the coefficient of multiple determination for the model increases slightly from .20 to .21. The only other independent variable in the model that had a significant net impact on the transfer phenomenon was high-school grade average. In contrast to the dependent outcomes measured in the one-year study, SAT had no signifi-

cant bearing on transfer after holding the other variables constant. Furthermore, although the number of developmental studies areas into which students placed had no significant effect on transfer (p≤.14), the relationship of those two indicators remained negative, net of the other variables in contrast to its positive influence in the one-year study. Gender and race had no direct effect on transfer activity as measured in this study.

Table 19. Full CPC Causal Model Analysis: DS and Three-Year Transfer.

| | Beta Weights | |
|---|---|---|
| Variables | Number DS Areas | Three-Year Transfer |
| CPC-Satisfied | -.10* | .15* |
| | (-.21) | (.15) |
| High-School Average | -.07+ | .21*** |
| | (-.12) | (.17) |
| SAT | -.66*** | .07 |
| | (-.005) | (.0002) |
| Female | -.04 | .05 |
| | (-.08) | (.05) |
| Black | .06+ | -.05 |
| | (.38) | (-.14) |
| Number of DS Areas | NA | -.11 |
| | | (-.05) |
| $R^2$ | .59*** | .20*** |

N=369
+p≤.10, *p≤.05, **p≤.01, ***p≤.001
Standardized regression coefficients are presented and unstandardized regression coefficients are shown parenthetically
NA-Not applicable

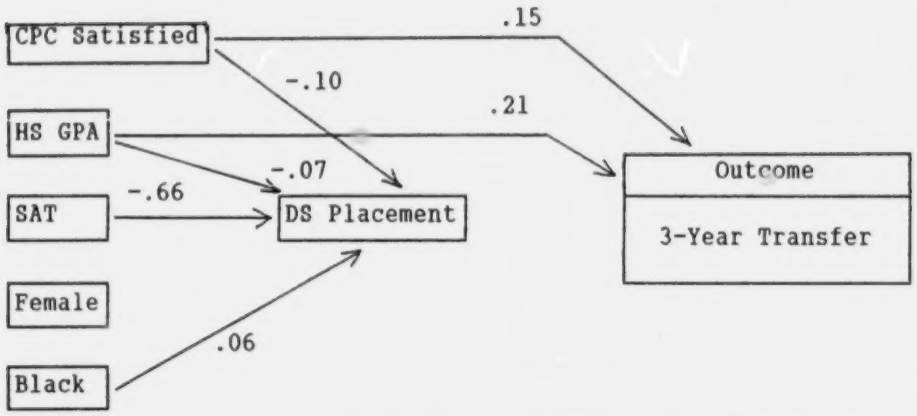


Figure 3. Significant path analysis results for transfer to a baccalaureate-granting institution within three years of entering Gainesville College (N=369). Only significant paths (p≤.10) are shown with corresponding standardized regression coefficients. All standardized coefficients (significant and nonsignificant) are shown in Table 19.

Table 20 presents the direct, indirect, and total effects of the independent variables. The indirect effects assess background factors' affects acting through the number of developmental studies requirements imposed upon the students as they enter Gainesville College. Developmental studies has no direct or unique effect on whether students transfer to a baccalaureate-granting institution within their first three years of entering Gainesville College. Moreover, developmental studies does not appear to serve as a significant transmitter of the indirect effects of the other independent variables in the model. It adds very little, if anything, to the total effects of the exogenous variables.

Table 20. Direct, Indirect, and Total Effects for Transfer Study. Indirect Effects through Developmental Studies.

| Variable | Three-Year Transfer Direct | Indirect | Total |
|---|---|---|---|
| CPC-Satisfied | .15* | .01 | .16* |
| HSA | .21*** | .01 | .22*** |
| SAT | .07 | .07 | .14 |
| Female | .05 | .00 | .05 |
| Black | -.05 | .01 | -.04 |
| DS Areas | -.11 | | -.11 |

N = 369
Note: ***p≤.001,**≤.01,*p≤.05
Significance levels for total effects were determined by the blocking approach described by Alwin and Hauser (1975). If a variable in a block of variables was significant in an equation using that block of variables and all variables in causally prior blocks, then significance for total effects was inferred.

## Limitations

Several limitations characterize the current study. First, it was conducted at a single two-year public college in one southern state, hence the results can only be generalized with caution to other institutions and only if their first-time freshman students share similarities with those followed in the study. Moreover, even within Gainesville College the study cannot be extrapolated to those students who attended part-time, delayed their entry into college after high school, or to those older non-traditional students who completed high school prior to the CPC mandate. Secondly, the study used the University System of Georgia's prescription for a college preparatory curriculum which is not necessarily the same as that defined by other states. Moreover, it is not likely that the instruction students

received at one high school is identical to that of another. Some high schools may provide a more rigorous education than others and even within the same high school some teachers may provide a richer learning experience as compared to their peers. One would expect some variance in what the college preparatory curriculum codes and high-school averages represent from one incoming student to another.

Other limitations stem from the indicators of college success. One cannot assume that freshman grade-point average represents the same academic experience from one student to another. Some course schedules are more difficult than others and the number of academic credits used to compute the grade-point average varied between students. Relatively few students in the study, especially those who entered without completing the CPC, actually earned a freshman year's worth of academic credits from their first fall quarter to the end of spring quarter, thus the term "freshman" is misleading. In addition, persistence into the second year is a more accurate descriptor than persistence into the sophomore year of enrollment, since few students in the study would have earned sufficient credits to be classified as a sophomore. Despite the difficulties associated with cumulative freshman grade-point average and one-year persistence, they are easily accessible as data elements and found extensively throughout the literature.

The number of course credits earned after one academic year is another measure of success that deserves additional

comment. Both academic and institutional credit courses were given equal weight in the analysis. However, it should be emphasized that developmental courses which award institutional credits are taught at a precollege level and credits earned in them cannot be applied towards graduation. Thus a student taking a mixture of developmental studies and regular placement courses may have full-time status, but not have made the same credit-hour progress toward an eventual degree as another student without developmental studies requirements. The number of earned credit hours is a good indicator when available to use along with persistence data, since it helps to more closely monitor student progress towards actual program completion.

Limitations were also evident in the three-year transfer study. The literature indicates that it is prudent to consider student aspirations when attempting to measure transfer activity. This study followed only those students with self-reported transfer majors. It is possible that for some students the aspiration was unrealistic and likely that at least some students changed their major intention without notifying the Guidance Center, hence their student record would not have been updated for advisor reassignment. By the same token, some students with self-declared nontransfer majors may have changed their intention without notifying the Guidance Center, thus omitted from the study. In addition, some students may have transferred to public or private institutions outside the University System of Georgia

without sending their transcripts, hence could not be traced. All things considered and in the hopes of creating a data set that can be duplicated for comparative studies, it is best to define a cohort that can be retrieved with reasonable ease at some later date without having to address every student idiosyncracy.

Another limitation of the study was the use of those predictors that could be gleaned from a transcript analysis. Other precollege variables appear in the literature that bear on the success of students in college (e.g. family income and parental education). Then too, whether students achieve success in college is influenced by the academic and social environment in which students pursue their studies. No attempt was made in this study to control for the receipt of financial assistance, student motivation, extracurricular involvement, and faculty-student interaction. It is possible that adding regression variables to the causal model would have further diluted the contribution of the college preparatory curriculum.

Finally the CPC code assigned to incoming students by the Admissions Office at Gainesville College and other units of the System is at its root level a code tethered to a specific series of course titles. It is not an absolute and unambiguous statement that certifies all dimensions of the student learning experience, nor can it guarantee that a specified set of course objectives has been mastered and retained. It is perhaps a step in the right direction, but

it is not as educators might hope, a guarantee of success in college.

# V. Conclusions and Implications

## Summary

Throughout the past two decades, numerous critics leveled charges that the educational system in the United States needed reform. Achievement test scores among high-school graduates were declining and the secondary school curriculum was deteriorating as evidenced by declining student participation in traditional college preparatory courses (Cohen and Brawer, 1989; Copperman, 1978). Other contributors to the problem identified by Maxwell (1979) include permissive standards and grade inflation.

On the college end of the educational pipeline, increasing numbers of first-time college freshmen were in need of developmental courses and college instructors were deploring the general lack of preparation among incoming students. Furthermore, a large number of students in Georgia and elsewhere were entering institutions of higher learning without having completed a college-track course of study in high school (Hudson and Pounds, 1989; Losak and others, 1982). The inescapable conclusion was that too many students entering both open-door colleges and selective universities lacked a solid academic foundation in high school and that this was a serious impediment to their progress in college.

Several national reports called for the reform of secondary schools and exhorted for colleges to raise their admissions standards. In an effort to stem the decline, several states to include Georgia revamped the academic track programs in high school and colleges and universities mandated a prescription of courses that were necessary for unconditional admittance. It might be argued that this is the beginning of rigid admission requirements that may shut the open door, but that need not happen. Instead, it can be viewed as a concerted effort to try to increase the level of readiness commensurate with college expectations and to identify those incoming students who might benefit from intervention strategies and developmental courses to insure academic success in college. Issues of college-readiness are in the forefront of community college concerns since their "open-doors" attract a disproportionate number of students in need of special assistance and remediation. It should be emphasized that no students are denied admission to an open-door institution like Gainesville College because of unsatisfied areas of Georgia's College Preparatory Curriculum; instead they are shunted into "remedial" courses to presumably bolster their ability to handle college-level work.

**College Admissions and High-School Courses.** College admission requirements that are tied to specific high-school courses are controversial. On the one hand, it is evident from numerous studies sponsored by the Educational Testing Service that student curricular choices in high school can

raise high-school averages and aptitude test scores and that these in turn serve as accurate and powerful predictors of college performance. In addition, a college-track academic environment in high school is likely to help shape the attitudes and study skills that support college success. Hence, students who aspire to college appear to be advantaged, if they are continually immersed and challenged by a well-defined curriculum designed to prepare them for college success as compared to one that emphasizes vocational training or one of a general nature. The assumption is that if students are not mandated to take high-school courses that are appropriate with respect to advanced learning in college, they may not. The driving logic underpinning such an assertion is compelling.

On the other hand, regression studies have indicated that completing a college preparatory curricula in high school does not contribute substantially to the prediction of student success in college independent of other more reliable and valid predictor variables. Much of the controversy surrounding the issue of mandated high-school curricula revolves around its predictive capacity with respect to college success over the first year of study. Considering the high intercorrelations ($p \leq .001$) between CPC-completion and SAT and high-school grade averages demonstrated in this study, it may be that this approach does not focus in on these two predictors and other dimensions that might ascribe

a greater overall impact to the precollege high-school track.

**Impact of CPC at Gaiensville College.** This study attempted to address whether the College Preparatory Curriculum mandated by the University System as necessary for unconditional admittance has a measurable impact on the academic success of students at a two-year public college. The College Preparatory Curriculum was implemented within the University System in 1984, in consultation with the Georgia Board of Education, to improve the academic preparedness of matriculating seniors. The 15-course precollege curriculum spans academic skills and competencies in English, foreign language, mathematics, science, and social sciences.

The explicit assumption that guided the policy was that high-school students who completed a prescribed curriculum would be advantaged in college over those who did not. The academic edge that CPC-completers would possess over noncompleters would presumably be evident in traditional indices of success such as fewer developmental studies needs, higher college grade averages, and higher persistence rates. In addition, policymakers might have speculated that satisfaction of all CPC areas in high school would increase the likelihood at a two-year unit of transfer to a baccalaureate-granting institution and continued progress toward a degree. The CPC policy was implemented in Georgia with great hopes, but without much empirical evidence that it would

actually serve its purposes. The state policy has been in effect for those high-school graduating classes from 1988 onward who entered any of the 34 University System units. The current study is one of several that attempt to determine whether the policy is addressing the educational needs of the state.

The 1205 high-school graduates in the study were first-time, full-time students who had graduated from high school in the June prior to their entry to Gainesville College during the fall quarters of 1988, 1989, and 1990. A subset of 369 students were followed over a three-year period to determine their transfer activity to senior colleges and universities. The entire cohort defined by the study was under the Regent's CPC admissions mandate throughout their high-school years. Although an attempt to maintain the homogeneity of the sample was made across all dimensions, some students entered developmental studies courses while others did not. Placement into the Developmental Studies program is determined by scores on a basic skills test and can occur regardless of whether the CPC was completed in English or mathematics.

This study developed a multivariate causal model to determine the extent to which completion of all five college preparatory curriculum areas in high school contributed to the academic success of students at a two-year college independent of other potential predictors of college success: high-school grade-point average, SAT total score,

gender, race, and developmental studies needs. The regression model also incorporated the number of developmental studies courses required of entering students as an intervening variable to explore its indirect relationship to the attainment of the educational outcomes - freshmen cumulative grade-point average, the number of earned credit hours after one academic year, persistence into the second year, and transfer to a baccalaureate-granting institution. In addition, the study looked at the striking differences in terms of academic performance and developmental studies placement that are revealed when students are separated on the basis of whether they completed the CPC in high school.

**Findings.** Regardless of the indicator investigated, those students in the bivariate analysis who satisfied all CPC areas in high school were characterized by a pattern of college achievement not observed in CPC-noncompleters. CPC-completers as compared to CPC-noncompleters had significantly higher college grade-point averages, earned more credits over a one-year period, were more likely to persist from one quarter to another, and transferred in greater relative numbers to four-year institutions.

Although the effects were not dramatic, the causal model detected significant differences in the attainment of educational outcomes between CPC-completers and CPC-noncompleters. The casual model data indicate that completion of the CPC, independent of the other variables used in the model, contributes significantly to higher earned credits

over the first three quarters, greater quarter-to-quarter persistence for males, and a greater likelihood that students will transfer to a baccalaureate-granting institution within their first three years. Intercorrelations reported in this study suggest that at least some of CPC's impact on college success may be expressed through indicators such as high-school average and aptitude test scores. These results suggest an academic advantage for CPC-satisfiers and support the proposition that completing the CPC positively influences the academic success of students as they progress through their studies at a two-year college.

### What is Embodied in the CPC Codes?

Policymakers should consider that it is not entirely clear what the CPC codes ideally embody. They are, however, more than just letters inscribed on a transcript. Taken together, they may represent a collection of behaviors, academic skills, and competencies that assure sufficiently motivated students reasonably safe passage through their first year of college study and beyond. One would expect that college-track students as evidenced by their CPC-seal diploma would leave high school with valuable study habits, confidence that they can accomplish rigorous college-level work, critical thinking skills, advanced literacy skills in writing and reading comprehension, numerical skills, and some imprint of course content and its relationship to the world around them.

CPC codes may also represent student motivation to enroll in and pass college preparatory courses in high school. This, in turn, may suggest the involvement of parents who encourage their children to take college preparatory courses and remain in them. In addition, since scholastic aptitude is related to coursework and can develop over time, it is likely that the codes represent to some extent the general state of student readiness for college in this regard. Hence, it appears that completion of the CPC may represent a number of factors that relate to college success. Whether the codes actually do embody all or even some of these ideal positive characteristics is an empirical question and beyond the scope of the current study.

If completion of the CPC in high school represents at least some of what is important to succeed in college, why then is it not a more powerful predictor when isolated from other predictors? For one, completion of a course does not in and of itself indicate that the student met all the course objectives just as a passing grade on a test does not signify that a student answered every question correctly. Secondly, some students can pass a course without much effort and consequently without much educational gain. Another consideration when evaluating the CPC is the severity with which the precollege curriculum should be constructed and applied. If the high-school grading system was so rigorous and mercilessly enforced that it literally guaranteed that all who succeeded would survive college, then

there is a distinct possibility that far too many marginal students would fail to keep up. These at-risk students might become overly discouraged from attempting a curriculum that might involve an inordinate amount of effort and struggle.

Then too, if students fail to make a passing grade in a particular area of the CPC, they have to repeat that course before enrolling in the next one. This might be an unacceptable alternative for a high-school student who knows the work can be made-up in college. Thus, a student might get off one lane of the academic track, yet take all or most of the other areas. It is difficult to say whether a student who has had 13 or 14 of the 15 CPC-seal courses and passed them with an 'A' average is significantly less prepared than the CPC-completer who graduated with a 'C' average. Furthermore, the data indicate that CPC-completion is not a guarantee of college-readiness as a sizeable percentage place into developmental studies courses. Lastly, it is likely that some aspects of the CPC are more critical to the development of scholastic aptitude then others. This may explain why CPC-completers appear to have only a slight edge on academic success in college.

Although it is tempting to assert that any advantage students bring with them to college is better than none, this is not necessarily the case from a cost-effectiveness perspective. Implementation of the CPC policy is an expenditure that should bring a reasonable return on the investment and be justifed in light of the other opportunities and

alternatives that might be lost for want of adequate funding. Moreover, the data are not so convincing that policy-makers shouldn't consider some degree of flexibility in levying admission conditions on students with high-school averages and SAT scores indicative that they have absorbed all that appears to matter most with respect to college success. Is it fair for a student with high SAT scores and an unsatisfied CPC area in foreign language to "remediate" this area in college by taking a two-quarter sequence of foreign language courses for institutional credit only? The answer is complex, especially since the courses carry college credit that can be used towards graduation for those students who satisfied the foreign language requirement in high school. Those who did not satisfy this area suffer from a case of double jeopardy. Educators must also take into account the expense of instructing the students, allocating scarce classroom space, providing laboratory experiences and paraprofessional assistance, and the clerical time to keep track of the student's progress. CPC remains, however, one of the few avenues that educators can directly manipulate to make improvements in the delivery of high school courses tailored for the college-bound student.

Completion of the CPC as a condition of regular college admission is viewed as an important "hammer" that encourages students to take a set of courses in high school that are "good" for them or pay a penalty in college. Without some means of sending a strong message to parents and pressing

teenage students to take the precollege curriculum seriously beginning in the ninth grade, too many students are likely to take an easier path making them more vulnerable to an inability to achieve college goals in years to come. High-school students should accept some responsibility for their curricular choices. The CPC policy seems imperfect, but all factors considered it may be a reasonable compromise. Some capable students are probably hurt by the punitive aspects of the System's make-up course policy so that others will ideally do what is in their best interest. Fortunately, the data indicate that the stronger the student is academically, the more likely they are to have finished the CPC, hence able to circumvent this problem of taking college-level make-up courses for institutional credit only.

It is critical to deal with underpreparation in high school by assisting students in making the best course selections, raising the expectations of faculty for their students, and ensuring that students acquire the basic skills and concepts that will bolster their college endeavors. Succeeding along with their peers in a precollege curriculum may help to acclimate students to the social and academic climate that they can expect in college-level work. Factors to be considered include frequency of reading comprehension assignments, vocabulary, mathematical literacy, pace at which the material is presented, and sharpening of aspirations to achieve a college degree. The motivation and confidence presumably gained by a precollege track, and the

socialization with peers who aspire towards college may be necessary to carry some students through the difficult period of adjustment during the first year that allows them to continue their studies into the sophomore year and beyond.

Advantages that might accrue to students within a college preparatory high-school program might include a heavier emphasis on studying, a propensity to complete assignments on time, and more inclination to do homework. Such advantages were found in a 1982 analysis by Losak and associates at Miami-Dade Community College in Florida (1982) in a comparison of remedial and regular placement students. They also found that those students who arrived at college without adequate high-school preparation were more likely to report that they picked easy courses in high school and were less likely to have used the library, visited a school counselor, written a paper, and to have taken more than two essay exams between the tenth and twelfth grades. When remedial students were asked for their recommendations to tenth graders on how to best prepare for college, over half of the respondents suggested taking college preparatory courses and emphasized that the more they took - especially courses in mathematics, English, and areas that required extensive reading - the better.

## Developmental Studies

Students who enter Developmental Studies programs are generally considered to be at a higher risk of not completing their college education as compared to those who do not need remedial work. As a result, these programs involve extensive support networks to assist and encourage the student in their studies and to retain them as long as possible. The correlation matrix indicated a negative relationship between developmental studies needs and the measures of college success. Nevertheless, this relationship did not hold true in the multivariate model. The causal model theorized that the need for developmental studies courses would hinder a student's progress, but instead it had a neutral or a positive influence on first-year college outcomes.

Although surprising, it is reasonable to expect the Developmental Studies program to be successful while holding the other variables constant. If it were not, then one might question the efficacy of this expensive and time-consuming program. It is also perhaps a testimony to the diligence and concern with which the college approaches these students that developmental studies placement is positively related to freshmen cumulative grade-point average and persistence. Hence, developmental studies placement alone is insufficient to predict whether students will progress in college. Other variables that must be considered include SAT scores and high-school grade averages. Developmental studies did not

have much of an influence one way or the other as an intervening variable through which the indirect effects of the other variables could be expressed. An exception might be the moderate indirect effect of SAT scores on freshmen grade-point average. The higher the SAT score the less likely a student is to place into the developmental studies program, hence less likely to be affected by its positive effect on freshmen year grades. It is encouraging that the positive contributions of developmental studies when the other variables are held constant helped to offset the negative relationship between it and the other indicators.

The positive contribution of developmental studies programs are supported to some extent by Kulik, Kulik, and Shwalb (1983). They conducted a meta-analysis of findings from 60 evaluation studies showing that special college programs for high-risk students have basically positive effects on students. High-risk students who enrolled in special programs stayed in college longer than control students and they received somewhat better grades in regular college courses (most of the studies measured persistence and grade-point averages over the first year only). The authors noted, however, that the effect on grade-point average did not always hold up after the first year. They also found that the least effective remedial programs were found in community colleges. They speculated that developmental studies courses offered in community colleges may be

too unchallenging to prepare students adequately for regular college work.

It appears obvious that there will be a continuing stream of underprepared students in need of remediation flowing into colleges and universities in the years ahead and, given the many educational and noneducational roles filled by the high schools, they will never be able to prepare all students for certain college success. The fundamental question then that will continue to confront institutions of higher education is: How to decrease the incidence of these students while still allowing for access and equity and an academic program in high school that is not so deliberately difficult that it overly discourages marginal students from participation in it.

## Transfer Activity

Transfer studies are valuable and insightful as to the extent to which students progress towards this educational goal, but they typically tread on problematic turf. Junior college students arrive with a wide variety of scholastic capabilities and behavioral patterns. It is difficult to determine whether those who did not transfer will eventually do so. Are they stop-outs or drop-outs? Might they transfer if followed for longer than three years or four years or five? Might it be that those students who enter higher education with unsatisfied CPC areas prolong their progress through college for reasons that were not detected by this

study? It might also be true that those who did not transfer despite their original intent to do so as evidenced by their self-declared major, met enough of their educational goal or scaled it down, then left higher education as satisfied students. Some students may have transferred to a vocational program, thus continued their postsecondary education. The study does not pass judgment that those students who did not transfer were "failures" or even that they are never likely to transfer. Nevertheless, the observation still holds that those first-time, full-time students who enter without unsatisfied CPC areas are more likely to progress towards the baccalaureate over their first three years than those with one or more unsatisfied areas. It would be of interest to extend this portion of the study out for another several years to determine if the relationship continues to hold.

The literature indicates that the dropout process is best explained by the interaction between the individual student and his particular college environment. The sum of the interactions is the process by which the student integrates into the academic and social systems of the college (Bean, 1986; Tinto, 1975). Most studies indicate that students who are less integrated along both dimensions are more likely to withdraw. A student's decision to pursue a college education begins with their academic skills, interests, family background, and their expectations of college. The motivation to persist depends, in part, on the extent to which they integrate into the fabric of the campus as evi-

denced by good grades and the formation of satisfying relationships with faculty and peers. Transfer rates at Gainesville College are most likely to hold steady or improve as a function of the campus' ability to extend appropriate academic programs and activities to students.

An interesting approach to documenting outcomes is that of the state of Maryland which computes a summary index they call the "Success Rate" for its community college students (McConochie and Rajasekhara, 1992). This index sums the percentage of full-time, first-time students who graduate, transfer to public four-year colleges within the state, or are still enrolled at the two-year college over a four-year period. Data indicate that the overall four-year "success rate" of the Maryland students who entered a state-supported community college during the fall of 1986 was 46 percent (26% transferred, 18% graduated, and 10% were still enrolled). The authors noted that the transfer rate was significantly higher for transfer majors as compared to career students and would have been higher overall if not for the students who transferred outside of the tracking system. The study also noted that the success rate of male students (44%) was lower than that of female students (49%). The University System of Georgia might consider longitudinally documenting educational outcomes by computing its own "Success Rate" index for two-year college students. This approach or something comparable would give the System a

tracking device to follow the academic progress of students who begin their studies at the two-year units.

## Future Research

The findings in this study suggest further research to clarify and extend the data and to refine the concept of a preparatory curriculum for higher education so that it best meets the needs of a state struggling to educate as many citizens as possible. Studies at other units of the University System are needed so that broader generalizations can be made concerning the issues associated with CPC-completion as a criterion for unconditional admission to a System unit. The Regent's Office of Institutional Research should consider a more detailed multivariate approach in their analysis of the college success of CPC-completers and CPC-noncompleters so that the contribution of Georgia's precollege curriculum is estimated independent of other variables that impinge on college success.

Another avenue of research that might prove productive would be to tie in questionnaires of students with transcript analyses to better determine the social and academic factors associated with college success. For example, to what extent does integration into the social and academic environment of the campus improve the chances that a student will persist at their college studies and progress academically to the point of transferring to a baccalaureate-granting institution? Research might chronologically detail

the perceptions and opinions of students over the three-year period. Questionnaires, however, have their own biases that must be considered such as inaccurate recall by students, distortion, and providing socially desirable responses.

Future studies might explore the most appropriate and flexible mix of courses that adequately prepares graduating high-school seniors for subsequent success in college. The data suggest that more studies need to be completed on the high-school side of the educational equation. This might prove to be fruitful, especially in terms of creating a meaningful dialogue between representatives from both the secondary (and primary) sector and higher education. This effort would be enhanced by the involvement of researchers in higher education with those from the secondary school system. Those in higher education are more likely to have access to sophisticated analytical tools and techniques that would help to more clearly determine the impact of a precollege curriculum, as well as other factors that may come into play in the prediction of college success.

Considering the support that students receive in college during their first year and that the majority of courses are of an introductory nature, it might be best to longitudinally investigate those measures of success that take students through at least two or three years of higher education. This might elucidate whether the impact of CPC-completion and Developmental Studies programs can carry students through to the years which might better indicate that they

are able to immerse themselves in college-level work and remain committed towards the pursuit of their educational goals.

A way to gauge the intended effectiveness of the CPC as a public policy is to determine whether it increased compliance among college-bound seniors since it took effect in the fall of 1988. A 1991 report by Hudson and Pounds demonstrates that it has not. Despite the efforts of high-school administrators, faculty, and counselors to encourage students to enroll in CPC-seal courses, students often fail to heed that advice. Up to 1991, there was no appreciable increase in the number of high-school students who have completed all of the CPC areas. Another avenue to measure its effectiveness in increasing preparedness is to determine whether it had an impact on decreasing developmental studies enrollments. This too is a serious concern that does not appear to be ameliorated by the System's policy three years after its implementation.

Questions that may be important in determining the overall impact of the college preparatory curriculum include:

1. To what extent does the System policy of forcing students to make-up those areas of the CPC that were not satisfied in high school encourage students to subscribe to the precollege track in the ninth grade? Future longitudinal research should attempt to determine the extent to which the CPC mandate has fundamentally altered the course-taking

patterns of high-school students, especially those academically marginal students for whom the policy might have the most influence.

2. Is the CPC more punitive than remedial by the time students matriculate into college? If it is punitive, is it a reasonable price to exact on those students with demonstrated ability and for whom the credits earned in a college-level course for the unsatisfied CPC area cannot be counted towards graduation?

3. Should students with good SAT scores and high-school averages be exempted from the CPC penalties imposed by the University System?

4. Should state policymakers use data such as these to suggest that the CPC-seal standards be raised even higher to insure even greater college success that can be attributable to the precollege curriculum? This approach may have an unintended side effect: Too heavy an emphasis on achieving college success as a direct by-product of the CPC in high school may create pressure to set expectations within the CPC-seal courses that might make it formidably difficult for some marginal students to cope, hence in a very real sense discourage some of the students who might benefit most from access to a precollege track.

5. How might results from studies concerning high-school preparation be used to create a meaningful dialogue between educators within the college and secondary sectors? Productive lines of research might explore avenues that would

allow for greater articulation between the various groups with a vested interest in a college-track curriculum that stands up to the scrutiny of parents, students, high-school counselors, faculty, administrators, and legislators.

6. Can the state continue its generous access policy to all the high-risk students that attempt college-level study? Considering that students pay only 20 to 25 percent of the cost of their undergraduate education and that many of those who enter college do not progress, it is clear that the state policy is expensive.

7. Regarding the specific findings at Gainesville College, did the students who left do so in good standing? If so, then why did they leave?

8. Why did a study of 1205 first-time, full-time students that spanned three fall quarters from 1988 to 1991 at a two-year System unit include no more than 37 Blacks?

9. To what extent does completion of all or parts of Georgia's CPC improve the aptitude and performance of students by their senior year of high school?

10. To what extent does the CPC develop attitudes and behaviors in high school that promote long-term success in college?

## Conclusion

Educational policymakers face difficult challenges as they attempt to fashion strategies to increase the college-going behavior of students and to increase the likelihood

that they will succeed in college. The effort, if it is to bear fruit over the long run, requires a partnership between colleges and the secondary school system. Although one hopes that solutions to intractable problems like college preparedness are implemented with efficiency, longevity, and great impact, the reality is generally more complex. There are many tangible and intangible factors that must come together to resolve the state's interest in increasing the number of college graduates. Mandating that students complete a college preparatory curriculum in high school or face coursework in college that may be both punitive and remedial in scope is one approach that has been implemented in Georgia. The data presented in this study, although not as compelling as one might hope, support the view that the CPC is a positive step in the right direction. Whether it is worth the trouble from a cost-effectiveness perspective is difficult to answer without carefully weighing alternative uses of the limited monies used to support and promote the CPC policy as it now exists. A good policy is one that produces good outcomes at an acceptable cost.

It would be a mistake to conclude that simply because CPC's predictive value in a multivariate analysis of college success is weak in comparison to scholastic aptitude test scores and high-school averages that the CPC mandate has relatively little merit as an educational tool. However, it would be correct to suggest that it may have little practical value when used as a criterion in a regression model to

determine regular admission eligibility over and above the contributions of SAT scores and high-school grade-point average. Academic prediction studies using CPC-codes, however, can be used as an early warning means of identifying those at-risk students that might have difficulty adjusting to the social and/or academic environment of the college. Students can be expected to undergo a period of transition before they internalize the values, attitudes, norms, and behaviors of the college to which they matriculate. Those students who have managed to complete the CPC in high school may be ahead in this regard and have an edge in terms of college success.

The presence of a college preparatory curriculum that can be closely monitored for its educational value and serve as a catalyst for dialogue provides an on-going process by which educators can shape the curriculum. The study suggests that simply knowing whether students completed the CPC is not adequate to accurately predict college success on all fronts, although it is a reasonable point of departure. Educators can only be expected to process a limited amount of data to evaluate a student's preparedness. The CPC codes help in this regard. They provide some evidence that the student has demonstrated sufficient foresight and motivation to invest in his or her own learning. The use of CPC-completion as a "label" to document the initial and longitudinal progress of students through college appears to distinguish dramatic bivariate differences when compared to those stu-

dents who did not satisfy all the CPC requirements. This approach, although simplistic, can be useful in student tracking and helping to identify those higher risk students who might benefit from special intervention strategies in high school and college. The more the college learns about the students who apply, the greater the chance that the college can assist students in making the interpersonal and activity connections that help them ultimately to continue their studies and grow as individuals.

A finding that may be of interest to high schools is the suggestion that merely completing the CPC in high school does not guarantee success in college, rather it is the quality of the experience as measured by SAT scores and high-school averages that seems to make the most significant contribution to subsequent success in college. Thus, any efforts to continue to reform the high-school curriculum should focus not only on the set of objectives associated with a given course title, but the relationship of the course to aptitude development and incentives that lead to greater classroom performance. What appears to be most important in the long run may not be whether students completed the CPC per se so much as the college aptitude and academic achievements they take out of high school.

Part of the value of the CPC appears to lie on the high-school side of the student's educational experience and is incorporated into the SAT score and high-school average and that its positive impact in this regard is carried into

college. Moreover, high-school counselors and faculty contend that the CPC requirement acts as a "hammer" that they can use to strongly encourage their students to take courses in high school that they might otherwise avoid to escape the punitive aspects of the Regent's policy upon entry into college.

Educators must make decisions about student preparation and curriculum redesign with scant empirical data. Decisions regarding curriculum offerings in college such as those that relate to make-up CPC work and remedial offerings are geared towards the preparation of entering students. It is essential that hard data be gathered over the years to assess the effectiveness of the policy and revise it as is necessary to ensure that its implementation best meets the needs of incoming students without relying on punitive measures of equivocal value. Closer articulation should be encouraged between colleges and the secondary school system so that academic performance expectations can be discussed and communicated with clarity to students.

It can only be to the long-term benefit of the students, the high schools, the colleges, and society in general to insist with as much emphasis as possible that students enroll in precollege courses that will help them move most effectively and efficiently through higher education. The CPC policy, despite its marginal impact on college outcomes over and above the other variables used in the causal model, is one approach to address the problem of underpreparedness

for college. Whether it is the best, most cost-effective approach from a policy standpoint is not clear. All in all, however, taking the full set of CPC courses in high school appears to be better than not completing them. Further action by the University System to improve and enforce the CPC now and in the future should assure entry to all motivated students and continue to raise the academic standards of System institutions.

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## Appendix

The following table displays fall-of-1988 students in the transfer study who (1) never transferred to a four-year University System of Georgia unit over the three-year study period, and (2) sent their Gainesville College transcripts to the indicated colleges and universities over the period September 1, 1988 to September 1, 1991. (No transcripts were dated later than June 15, 1991). Students are separated by whether they satisfied all areas of the CPC or had one or more unsatisfied areas.

CPC-NOT FULLY SATISFIED

| Institution | State | n[1] | Actually Enrolled |
|---|---|---|---|
| Brenau College | GA | 3 | 3 |
| Colorado State University | CO | 1 | 0 |
| Georgetown University | DC | 1 | 0 |
| Mercer University | AL | 1 | 0 |
| Piedmont College | GA | 1 | 1 |
| Savannah College of Art & Design | GA | 1 | 1 |
| Southern Illinois University | IL | 1 | 1 |
| University of Alabama | AL | 1 | 1 |
| Total Sent Transcripts | | 10 | 7 |
| Percent of Total CPC-NS (N=170) | | 5.9 | 4.1 |

CPC-FULLY SATISFIED

| Institution | State | n[1] | Actually Enrolled |
|---|---|---|---|
| Auburn University | AL | 3 | 2 |
| Berry College | GA | 1 | 1 |
| Brenau College | GA | 4 | 4 |
| Embry-Riddle Aeronautical Univ | FL | 1 | 1 |
| Florida State University | FL | 1 | 1 |
| LaGrange College | GA | 1 | 0 |
| Oral Roberts University | OK | 1 | 1 |
| Piedmont College | GA | 3 | 3 |
| University of NC-Asheville | NC | 1 | 1 |
| Total Sent Transcripts | | 16 | 14 |
| Percent of Total CPC-S (N=199) | | 8.0 | 7.0 |

n[1] - Number of students who sent transcripts.
CPC-S: All CPC areas satisfied, CPC-NS: One or more CPC areas not satisfied